Summary of Non-Halibut Catch from the Standardized Stock Assessment Survey Conducted by the International Pacific Halibut Commission in British Columbia from June 3 to August 27, 2010

R.G. Flemming, K.L. Yamanaka, K. Cooke, and C. Dykstra

Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
Nanaimo, British Columbia
V9T 6N7

2012

Canadian Technical Report of Fisheries and Aquatic Sciences 2989

Fisheries and Oceans
Pêches et Océans

Canada

Canadian Technical Report of Fisheries and Aquatic Sciences

Technical reports contain scientific and technical information that contributes to existing knowledge but which is not normally appropriate for primary literature. Technical reports are directed primarily toward a worldwide audience and have an international distribution. No restriction is placed on subject matter and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Technical reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1-456 in this series were issued as Technical Reports of the Fisheries Research Board of Canada. Numbers 457-714 were issued as Department of the Environment, Fisheries and Marine Service, Research and Development Directorate Technical Reports. Numbers 715-924 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Technical Reports. The current series name was changed with report number 925.

Technical reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport technique canadien des sciences halieutiques et aquatiques

Les rapports techniques contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui ne sont pas normalement appropriés pour la publication dans un journal scientifique. Les rapports techniques sont destinés essentiellement à un public international et ils sont distribués à cet échelon. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports techniques peuvent être cités comme des publications complètes. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports techniques sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publication scientifiques et techniques du Ministère.

Les numéros 1à 456 de cette série ont été publiés à titre de rapports techniques de l'Office des recherches sur les pêcheries du Canada. Les numéros 457 à 714 sont parus à titre de rapports techniques de la Direction générale de la recherche et du développement, Service des pêches et de la mer, ministère de l'Environnement. Les numéros 715 à 924 ont été publiés à titre de rapports techniques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 925.

Les rapports techniques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Technical Report of

Fisheries and Aquatic Sciences 2989

2012

SUMMARY OF NON-HALIBUT CATCH FROM THE STANDARDIZED STOCK ASSESSMENT SURVEY CONDUCTED BY THE INTERNATIONAL PACIFIC HALIBUT COMMISSION IN BRITISH COLUMBIA FROM JUNE 3 TO AUGUST 27, 2010

by

R.G. Flemming[1], K.L. Yamanaka[1], K. Cooke[1], and C. Dykstra[2]

[1]Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
Nanaimo, British Columbia
V9T 6N7

[2]International Pacific Halibut Commission
2320 West Commodore Way, Suite 300
Seattle, Washington
98199-1287

© Her Majesty the Queen in Right of Canada 2012
Cat. No. Fs 97-6/2989E ISSN 0706-6457

Correct citation for this publication:

Flemming, R.G., Yamanaka, K.L., Cooke, K., and Dykstra C., 2012. Summary of non-halibut catch from the Standardized Stock Assessment Survey conducted by the International Pacific Halibut Commission in British Columbia from June 3 to August 27, 2010. Can. Tech. Rep. Fish. Aquat. Sci. 2989: viii + 99 p.

TABLE OF CONTENTS

LIST OF TABLES .... **iv**
LIST OF FIGURES .... **v**
LIST OF APPENDICES .... **vi**
ABSTRACT .... **vii**
RÉSUMÉ .... **viii**
1.0 INTRODUCTION **1**
2.0 METHODS **1**
2.1 IPHC CHARTERED VESSELS AND SURVEY LOCATIONS 1
2.2 FISHING GEAR AND OPERATIONS 2
2.3 DATA COLLECTION 2
2.4 CATCH RATE 2
2.5 RELATIVE ABUNDANCE INDICES 3
2.5.1 Relative Abundance Index, Median Catch Rate *3*
2.5.2 Catch Rate Trends by Station *3*
2.5.3 Relative Abundance Index, Frequency of Catches *4*
2.5.4 Effect of String Length *4*
3.0 RESULTS AND DISCUSSION **5**
3.1 SURVEY LOCATIONS 5
3.2 CATCH SUMMARY 5
3.2.1. Hook by Hook *6*
3.2.2. Biological Sampling *6*
3.3 CATCH RATES 6
3.4 RELATIVE ABUNDANCE INDICES 7
3.4.1 Results of limiting string length (data) *7*
3.4.2 Relative Abundance Index, Median Catch Rate *8*
3.4.3 Catch Rate Trends by Station *8*
3.4.4 Relative Abundance Index, Frequency of Catches *9*
SUMMARY **9**
ACKNOWLEDGEMENTS **10**
REFERENCES **11**

LIST OF TABLES

Table 1. Summary of species catch brought on board in numbers 13

Table 2. Summary of species catch identified but escaped before being brought on board ("lost at the roller") in numbers. 14

Table 3. Total landed weight (kg) by species for the BC stations in the 2010 IPHC survey. 14

Table 4. Summary of hook observations 15

Table 5. Number of hooks deployed and summary of line snarls for 2003 to 2010......... 15

Table 6. Number of specimens, by species, measured for length, examined for sex and maturity state, and with otoliths removed for ageing. 16

Table 7. Summary of rockfish fork length (round, cm) 17

Table 8. Sexual maturity, assessed visually, for male and female rockfish species 19

Table 9. Summary of 2010 rockfish catch rates. 20

Table 10. Catch data summary for Quillback, Yelloweye, Redbanded and Rougheye Rockfish caught on the IPHC SSA survey from 2003 to 2010... 21

Table 11. Catch frequency from all skates fished at each station for Redbanded, Yelloweye, Rougheye and Quillback Rockfish caught on the IPHC SSA survey from 2003 to 2010. 21

LIST OF FIGURES

Figure 1. 2010 IPHC SSA survey stations grouped by mean depth-of-fishing in metres. 22

Figure 2. Standard deviation of mean set depths from 2003 to 2010 by IPHC station ... 23

Figure 3 Relative proportions of maturity states of Redbanded Rockfish males [m] (left panel) and females [f] (right panel) caught from 2003 to 2010 in the month of June. 24

Figure 4 Relative proportions of maturity states of Yelloweye Rockfish males (left panel) and females (right panel) caught from 2003 to 2010 in the month of June.. 24

Figure 5 Relative proportions of maturity states of Rougheye Rockfish males (left panel) and females (right panel) caught from 2003 to 2010 in the month of June.. 25

Figure 6 Relative proportions of maturity states of Quillback Rockfish males (left panel) and females (right panel) caught from 2003 to 2010 in the month of June. 25

Figure 7 2010 catch rate by station (*U*) of Redbanded Rockfish 26

Figure 8. 2010 catch rate by station (*U*) of Yelloweye Rockfish 26

Figure 9. 2010 catch rate by station (*U*) of Rougheye Rockfish 27

Figure 10. 2010 catch rate by station (*U*) of Quillback Rockfish 27

Figure 11. Redbanded Rockfish – Relative abundance indices 28

Figure 12. Yelloweye Rockfish – Relative abundance indices 29

Figure 13. Rougheye Rockfish – Relative abundance indices 30

Figure 14. Quillback Rockfish – Relative abundance indices 31

Figure 15. Redbanded Rockfish catch rate trends by station from 2003 to 2010 32

Figure 16. Yelloweye Rockfish catch rate trends by station from 2003 to 2010 33

Figure 17. Rougheye Rockfish catch rate trends by station from 2003 to 2010 34

Figure 18. Quillback Rockfish catch rate trends by station from 2003 to 2010 35

LIST OF APPENDICES

Appendix A. 2010 IPHC Survey Sampling Protocol..37

Appendix B. Summary of set specifications by vessel, including set number, IPHC station number, date, location (start and end latitudes and longitudes in degrees, decimal minutes), depths (minimum, maximum and average in metres) and times (end deployment and begin retrieval). 75

Appendix C. Set information by PSFMC area, common IPHC station and year (2003 to 2010), showing number of hooks deployed, returned, with bait, empty, or with catch, separated for Halibut, North Pacific Spiny Dogfish, Redbanded Rockfish, Yelloweye Rockfish, Rougheye Rockfish, and Quillback Rockfish, with catch per 100 hooks shown for rockfish.. 79

ABSTRACT

Flemming, R.G., Yamanaka, K.L., Cooke, K., and Dykstra, C., 2012. Summary of non-halibut catch from the Standardized Stock Assessment Survey conducted by the International Pacific Halibut Commission in British Columbia from June 3 to August 27, 2010. Can. Tech. Rep. Fish. Aquat. Sci. 2989: viii + 99 p.

Since 2003, a third observer has been deployed on the International Pacific Halibut Commission's (IPHC) Standardized Stock Assessment (SSA) survey in British Columbia, IPHC regulatory area 2B. This document summarizes the non-Halibut catch during the 2010 survey and constructs an index of relative abundance for four species of rockfish: Redbanded (*Sebastes babcocki*), Yelloweye (*S. ruberrimus*), Rougheye (*S. aleutianus*), and Quillback (*S. maliger*) from survey data collected from 2003 to 2010. This index shows a rate of change of +8%, +17%, and -24%, for Redbanded, Yelloweye, and Rougheye Rockfish, respectively. The increase for Quillback Rockfish is +118%, but this value may be unduly influenced by two low median CPUE values at the beginning of the series in 2003 and 2004. The trends of the transformed frequency of catches are nearly level at +0.07%, +0.26%, -0.04%, and +0.23% for Redbanded, Yelloweye, Rougheye, and Quillback Rockfish, respectively.

RÉSUMÉ

Flemming, R.G., Yamanaka, K.L., Cooke, K., and Dykstra, C., 2012. Summary of non-halibut catch from the Standardized Stock Assessment Survey conducted by the International Pacific Halibut Commission in British Columbia from June 3 to August 27, 2010. Can. Tech. Rep. Fish. Aquat. Sci. 2989: viii + 99 p.

Depuis 2003, un troisième observateur a été affecté à l'étude sur l'évaluation des stocks normalisés de la Commission internationale du flétan du Pacifique (CIFP) en Colombie-Britannique, dans la zone de réglementation 2B de la CIFP. Le présent document fait un résumé des captures de poissons autres que le flétan durant l'étude de 2010 et établit un indice de l'abondance relative de quatre espèces de sébastes : le sébaste à bandes rouges (*Sebastes babcocki*), le sébaste aux yeux jaunes (*Sebastes ruberrimus*), le sébaste à oeil épineux (*S. aleutianus*) et le sébaste à dos épineux (*Sebastes maliger*) à partir des données de l'étude recueillies de 2003 à 2010. Cet indice montre des taux de variation de +8 %, +17 % et -24 %, respectivement, pour le sébaste à bandes rouges, le sébaste aux yeux jaunes et le sébaste à œil épineux. Le taux de croissance enregistré pour le sébaste à dos épineux est de +118 %. Cependant, cette valeur pourrait être faussée par deux faibles valeurs médianes de prise par unité d'effort (PUE) au début de la série de données en 2003 et 2004. Les tendances dans la fréquence transformée des prises sont presque nulles, soit +0,07 %, +0,26 %, -0,04 % et +0,23 %, respectivement, pour le sébaste à bandes rouges, le sébaste aux yeux jaunes, le sébaste à œil épineux et le sébaste à dos épineux.

1.0 INTRODUCTION

The International Pacific Halibut Commission's (IPHC) Standardized Stock Assessment (SSA) survey is a fixed-station longline survey that extends from southern Oregon to the Bering Sea. This survey serves to index Pacific Halibut (*Hippoglosus stenolepis)* abundance and provide accompanying biological samples to assess the Pacific Halibut (Halibut) stock. The British Columbia (regulatory area 2B) portion of this survey has been conducted annually in various configurations from 1963 to the present (www.iphc.washington.edu). Since 2003, the IPHC has provided the opportunity to deploy an additional technician during the survey to identify the catch to species level on a hook-by-hook basis and to collect biological samples from rockfish (Yamanaka *et al.* 2004, 2007, 2008, and 2011; Lochead *et al.* 2006; Obradovich *et al.* 2008; Flemming *et al.* 2011). Between 2003 and 2006, a contractor was hired to conduct this onboard sampling; beginning in 2007 the IPHC was contracted by DFO to provide the third technician for this survey. In addition to Halibut, many other groundfish species are commonly caught on the survey including North Pacific Spiny Dogfish (*Squalus suckleyi*), Sablefish (*Anoplopoma fimbria*), and rockfishes (*Sebastes* spp.).

Similar to past reports, this report summarizes the catch and effort by location and the biological data for the rockfish species caught incidentally during the survey. Catch and effort data collected from the IPHC SSA survey in British Columbia provide informative coastwide relative abundance indices for many groundfish species.

2.0 METHODS

2.1 IPHC Chartered Vessels and Survey Locations

The *F/V Proud Venture* and *F/V Vanisle* were chartered in 2010 to conduct the Canadian portion (Area 2B) of the IPHC SSA surveys. The *F/V Proud Venture* (CFV/VRN 23197) is a 70-foot steel vessel, skippered by Charles Harper. The *F/V Vanisle* (CFV/VRN 21912) is a 69-foot vessel, skippered by Rob Stanley. The *Vanisle* also conducted portions of the IPHC SSA survey in Alaska.

The Canadian portion of the IPHC survey consists of 170 fixed (non-random) survey stations. From 1998 to the present, survey stations are positioned equidistant from one another on a 10 nautical mile (nmi) square grid. Beginning in 1998, regulatory area 2B was divided into four survey regions: 'Vancouver', 'Goose Island', 'St. James', and 'Charlotte'. Surveys were conducted annually in all regions with the exception of 'Vancouver', which was surveyed in 1999 and in years since 2001. The 2010 Area 2B and SE Alaska bycatch sampling manual prepared by IPHC (Appendix A) presents maps of these stations (labelled "IPHC Stations by DFO Area") in Appendix 3 of that document. Locations of stations fished in 2010 are also plotted (by mean depth) over survey regions and Pacific States Marine Fisheries Commission (PSMFC) areas in Figure 1.

2.2 Fishing Gear and Operations

Standardized "conventional" (fixed) longline fishing gear was deployed during the survey and standardized fishing operations followed, as required by the IPHC report of assessment and research activities (http://www.iphc.int/publications/rara/2010/2010.377.2010Standardizedstockassessmentsurvey.pdf). Fishing gear specifications and fishing operations are detailed in Yamanaka *et al.* (2004). The number of skates set has varied over the survey series. Table 5 includes a summary of the number of skates set in each year. For 2010, eight skates per string were deployed. The duration of the fishing event or 'soak time' of the set is calculated as the time elapsed between the last anchor set over the stern and the first anchor hauled aboard (Yamanaka *et al.* 2004). A Sea-Bird Electronics Inc SeaCat 19 water column profiler (temperature, depth, and conductivity) was deployed on all sets. Data are available from the IPHC upon request. Average bottom depths are calculated as the average of the minimum and maximum bottom depths of the set.

2.3 Data Collection

The hook-by-hook observations and biological sampling were conducted as described for the 2003 survey (Yamanaka *et al.* 2004). Appendix A details the biological sampling protocol compiled by the IPHC. For 2010, all rockfish species were sampled. No attempt was made to distinguish Blackspotted Rockfish (*Sebastes melanostictus*) from Rougheye Rockfish (Orr and Hawkins 2008). In 2008 and earlier years, the majority of rockfish length data was collected on dressed fish (gilled and gutted with gonads intact), and conversion factors to round length were calculated for key species (Flemming *et al.*, 2011). Beginning in 2009 and continuing for 2010, all rockfish length and weight data were collected on round fish. Data for one Silvergray Rockfish (*S. brevispinus*) that was dressed before being measured will be omitted from the summary statistics.

2.4 Catch Rate

Catch rate (U) is defined here as the total number of fish caught (N) divided by the number of normal condition hooks (H) returned from the set, multiplied by 100. The number of fish caught does not include those fish that were identified but escaped before being brought on board (i.e., lost at the roller). The hook count excludes all missing, bent, and broken hooks.

$$U = \frac{N}{H}100 \tag{1}$$

For this report, U is calculated for each combination of rockfish species, set (or station), and year.

Summary statistics are calculated from the 2010 non-zero catch rates using all available data for the whole coast and by each PSMFC area grouping (3C/D,5A; 5B; 5C/D; 5E). Statistics include mean, median, standard deviation, sample variance, minimum, maximum, and the proportion of non-zero catches (positive catch rate).

For each of the four most commonly caught rockfish, the catch rate (U) at each station is portrayed on a map.

In addition, for the four most commonly caught rockfish, catch rates for each combination of species, station, and year are re-calculated using two reduced datasets, one limited to data from the first 5 skates and one to data from the first 4 skates. See Section 2.5.4 *"Effect of String Length"* below, for an explanation of the use of these alternate datasets.

2.5 Relative Abundance Indices

For the time series of data from earlier surveys conducted in 1995 to 2002, a relative abundance index is presented in Yamanaka *et al.* (2011).

2.5.1 Relative Abundance Index, Median Catch Rate

A relative abundance index is constructed for each species of the four most commonly caught rockfish from $\log_2$ transformed non-zero catch rate data. A median value is obtained for each year from all stations fished (at which at least one rockfish of the species of interest was caught), coastwide, and a simple linear regression is performed on these values. Examining the slope of the regression line running through the median values gives an annual logarithmic growth rate (b), where a slope of 1 and -1 reflect a doubling and halving, respectively, of the catch rate (Schnute *et al.* 2004). The accumulated relative change (R_l) is calculated from:

$$R_l = 2^{b(l-1)} - 1 \qquad (2)$$

where b is the annual logarithmic growth rate and l is the number of observations over the time series, in this case 8 years (Schnute *et al.* 2004). R_l is called the series growth rate in this report.

During the period of this series, from 2003 to 2010, a third technician collected complete hook-by-hook catch information, and survey design, gear specifications, and fishing operations were consistent. Hook counts exclude all missing, bent or broken hooks. This index benefits from the inclusion of data from all stations, accounting for hook problems, and its conceptual simplicity. With eight years of data this index can be expected to capture trends in relative abundance (Yamanaka *et al.* 2004).

The relative abundance index using median catch rates is also re-calculated using catch rates from the two alternative reduced datasets. See Section 2.5.4 *"Effect of String Length"* below, for an explanation of the use of these alternate datasets.

2.5.2 Catch Rate Trends by Station

To explore potential spatial heterogeneity in catch trends, an analysis of catch rate trend at each station is performed for each species of the four most commonly caught rockfish. A simple linear regression is performed at each station on the $\log_2$ transformed non-zero catch rates calculated from all available skates for each year over the period of this series from 2003 to 2010. If, at a given station, there are at least 4 occurrences of the species of interest and the standard error of the regression is less than a threshold value then the trend is considered meaningful and the resulting slope is portrayed on a map. Scatter plots were also produced to visually evaluate trends at individual stations and discover potential outliers and anomalies.

2.5.3 Relative Abundance Index, Frequency of Catches

Only a small proportion of the stations fished in this Halibut-directed survey yield a rockfish catch. Since the index of relative abundance using median catch rate (R_l) is determined from non-zero catches, the trends in the frequency of any catch over time are also examined. Because this is a spatially explicit survey, a positive trend may represent an increasing spatial distribution of rockfish as more of the stations are yielding rockfish. Bannerot and Austin (1983) examined frequency distributions of catch per unit effort and independent estimates of abundance in a hook and line fishery, and systematically related various descriptors of the distributions. They showed that the square root of the relative frequency of zero catches explained more variation in abundance than any other variable. In this report, to produce an index that can be intuitively interpreted, the square-root transformed ratio of zero catches is subtracted from one so that there is a direct relationship between the index (I) and relative abundance:

$$I = 1 - \sqrt{\frac{F_0}{F}} \tag{3}$$

where F_0 is the number of stations with no catch and F is the total number of stations fished for the given species and year. A linear regression through the I value for each year gives a slope estimate that describes the average annual change over the series (I_l).

The relative abundance index using frequency of zero catches is also re-calculated using the two reduced datasets. See Section 2.5.4 *"Effect of String Length"* below, for an explanation of the use of these alternate datasets.

2.5.4 Effect of String Length

A longer string will have a greater likelihood of achieving a positive catch and of catching larger numbers of fish simply because it deploys more hooks. A longer string on the IPHC SSA survey may also have a greater likelihood of achieving a positive rockfish catch because it may be more likely to encroach on rockfish habitat. There may also be a third unrelated "end-effect" where the end of a string might produce a higher catch rate than the beginning or centre of the string, regardless of total string length.

Calculating catch rate per 100 hooks removes the effect of annual changes in string length from the catch rate. There are 100 consistently spaced hooks on a standard skate, described as an "effective skate" by the IPHC (Clark and Hare, 2006). A given catch rate (U) and the index based on median catch rates (R_l) should not be affected by the number of skates fished.

To account for the effect of string length on the frequency of positive catches, the relative abundance index using frequency of catches (*I*) must be calculated using a consistent string length. The smallest number of skates, five per set, were fished in 2007 and 2008.

Finally, to investigate the possible "end-effect", the data can be further limited to the first 4 skates fished, trimming at least one skate from the end of each set.

As it was convenient to do so, the catch rates used to derive both relative abundance indices were re-calculated using all three methods: the full dataset available and the two alternative reduced datasets. See Section *3.4.1 Results of limiting string length (data)* below, for the results of these investigations.

3.0 RESULTS AND DISCUSSION

3.1 Survey Locations

Figure 1 shows survey locations grouped by mean depth of fishing plotted over IPHC survey regions, and PSFMC areas. The *F/V Proud Venture* fished the 'Vancouver', 'Goose Island', and 'St. James' regions between June 3 and August 3, 2010 and the *F/V Vanisle* fished the 'Charlotte' region between August 8 and August 27, 2010. (The *F/V Vanisle* also conducted portions of the IPHC SSA survey in the 'Fairweather' and 'Trinity' regions in Alaskan waters.) Details for each set are listed in Appendix B.

To assess whether this set station IPHC survey is sampling consistent depths, a summary of fishing depth by station from 2003 to 2010 is presented in Figure 2. The standard deviation of mean set depths by IPHC station in Area 2B is less than 10 metres for 151 stations. Six stations have a standard deviation of mean set depths between 20 and 54 metres; the mean depth of these stations ranges from 160 to 400 metres. Stations for which the depth class has changed over the time series are also indicated, based on target depth classes of 20-70, 71-150, and 151-260 (or greater) metres used for the annual depth stratified, random design, longline research survey over hard bottom areas conducted by DFO and industry in British Columbia. Stations with steep and complex benthic terrain, such as station 2130, will have more variation in fishing depth, as a small horizontal difference in gear placement may result in a large vertical difference.

3.2 Catch Summary

The DFO "GFBio" database archives data from the IPHC SSA survey under TRIP_IDs 70627 (*F/V Proud Venture*) and 70628 (*F/V Vanisle*) for 2010. The Fisheries Operations System (FOS) database houses landed catch weights under Trip IDs 143330, 144174, 144838, 145769, 146646, 147505, and 148715 (*F/V Proud Venture*), and 149348, 149730, 152020, and 154597 (*F/V Vanisle*), readily accessible through the Groundfish Section database front-end "GFFOS". Appendix C lists detailed set information by PSFMC area, common IPHC station, and year (2003 to 2010). Each record shows the number of hooks deployed, returned, with bait, empty, or with catch. Catch is separated for Halibut, North Pacific Spiny Dogfish (Dogfish), Redbanded Rockfish, Yelloweye

Rockfish, Rougheye Rockfish, and Quillback Rockfish, with catch per 100 hooks shown for rockfish.

Species catch (numbers of fish) is shown in Table 1. Dogfish, Halibut, and Sablefish are the three most commonly caught species on the survey, accounting for 78% (in numbers) of all species caught. Table 2 lists species that were identified at the surface but escaped before being brought on board, which amount to only 0.5% of the total catch of marine fish. A total of 61,878 kg of Halibut and 13,310 kg of rockfish were landed during the survey (Table 3). Yelloweye Rockfish and Redbanded Rockfish account for the 2nd and 3rd greatest landed weights by species. Sablefish caught on the 2010 IPHC SSA survey were not landed.

3.2.1. Hook by Hook

Of the hooks deployed on the survey, 42% returned empty, 27% returned with bait or bait skin, and 30% captured a fish or an invertebrate (Table 4). Less than 1% of the hooks were missing, bent or broken. Table 5 lists the total number of hooks deployed in each year from 2003 to 2010, and summarizes line snarls. There were 747 line snarls in 2010, which is slightly higher than in previous years. Fish are often caught on hooks involved in line snarls, so these hooks are counted towards fishing effort.

3.2.2. Biological Sampling

Biological samples were taken for 15 species of rockfish, including 1691, 1517, 246, and 149 otolith pairs from Yelloweye, Redbanded, Quillback, and Rougheye Rockfish, respectively (Table 6).

Table 7 summarizes rockfish length by species for all regions combined, and by PSMFC area. All areas had a similar mean size for Yelloweye Rockfish of 55 to 56 cm. Area 3C/D, 5A had the largest maximum size of 76 cm.

Rockfish sexual maturity summaries are shown in Table 8. The majority of rockfish caught during the survey are sexually mature. In 2010 there was a higher proportion (55%) of male Yelloweye Rockfish in the catch than females.

At the time of this report, age determination had not been completed for any of the samples collected on the 2010 IPHC survey.

Mosaic plots of proportions of rockfish at each maturity stage for every year of the 2003 to 2010 time series are presented in Figures 3 to 6 for the four commonly caught rockfish. Data for these plots are limited to fish assessed in the month of June only.

3.3 Catch Rates

Summaries of non-zero rockfish catch rates (*U*) from all skates fished at each station on the 2010 survey, for the entire BC coast (IPHC area 2B) and separated by PSFMC areas, are presented in Table 9. Overall mean catch rates were highest for Redbanded and Yelloweye Rockfish at 2.7 fish per 100 hooks and 3.3 fish per 100 hooks, respectively. The highest mean catch rate for Redbanded Rockfish occurred in area 5E at 4.8 fish per

100 hooks, while for Yelloweye Rockfish the highest rates occurred in areas 5B at 6.2 fish per 100 hooks.

Table 9 also shows the proportion of positive catches for each rockfish species from all skates fished at each station in 2010. Redbanded and Yelloweye Rockfish occurred in only 75 and 67, respectively, of 170 sets. Quillback Rockfish occurred in only 33 sets. Canary, Rougheye, and Silvergray Rockfish were encountered on average in 15% of the sets. Other rockfishes were caught only sporadically, ranging from 1 to 8 occurrences on the 2010 survey.

The spatial distribution of rockfish catches from all skates fished on the 2010 survey (*U*) of the four most commonly caught species are shown in Figures 7 through 10. Redbanded, Yelloweye, and Quillback Rockfish were caught throughout the entire survey area. Rougheye Rockfish occur in greater numbers in the north half of the study area. Redbanded Rockfish occur consistently in the deepest stratum of the 'St. James' and 'Goose Island' IPHC survey regions. Generally, the distributions of the catch rates are related to mean fishing depth.

3.4 Relative abundance indices

A relative abundance index based on median catch rate (R_l) and an index based on frequency of catches (I_l) were constructed for each of four commonly caught rockfish species: Redbanded, Yelloweye, Rougheye, and Quillback. These indices employ all 170 stations fished each year between 2003 and 2009, with the exception of one station in 2008 for which hook tally data was lost overboard. Fish identified as Blackspotted Rockfish in 2009 have been aggregated with Rougheye Rockfish to maintain comparability with other survey years.

Figures 11 through 14 present the abundance indices for the four commonly caught rockfish species. Boxplots of the $\log_2$ transformed non-zero catch per unit effort for the time series are shown in the upper panels. The median value of all $\log_2$ transformed non-zero catch per unit effort values over the time series ("series median") and the accumulated relative change (R_l) are listed for each species. The lower panels show positive catch indices (I) with regression lines showing the average annual change (I_l).

3.4.1 Results of limiting string length (data)

There is no compelling reason to limit the data for the index of relative abundance based on median catch rates (R_l): (i) Limiting the data to 5 skates results in a noticeably different regression line only for Rougheye Rockfish, reducing the accumulated relative change from -24% to -51%. A relatively large increase in median catch rate in 2004 primarily influences this change. (ii) None of the trends, using the full or the reduced datasets, is statistically significant at the 0.05 level, with the exception of Quillback Rockfish limited to 5 skates with a p-value of 0.017. Further limiting the data to 4 skates increases the p-value to worse than that obtained from the full dataset. This inconsistent response is probably due to an already low sample size of Quillback Rockfish on this survey. (iii) For Yelloweye and Rougheye Rockfish, reducing the number of skates increases the standard error of the regression residuals (σ). For Redbanded Rockfish the difference in σ is negligible, probably attributable to the already larger sample of this species taken on this survey. (iv) Further limiting the data from 5 skates to 4 skates results in higher series median catch rates for all four of the commonly caught rockfish. This result is contrary to expectations; these data do not clearly illustrate any "end-effect".

For the index of relative abundance based on frequency of catches (I_l), for all four rockfish species considered in this report, limiting the data to the first 5 skates results in the following observations: (i) a slightly lower mean frequency of positive catches; (ii) a small difference in the average annual change for Redbanded, Rougheye, and Quillback Rockfish; (iii) a relatively large increase in the average annual change (I_l) from -0.1% to +0.26% for Yelloweye Rockfish; and (iv) a reduction in the standard error of the regression residuals (σ) for all species. Limiting the data to the first 4 skates further reduces the mean frequency, but does not appreciably alter the average annual change (I_l); sample variance can either increase or decrease very little. The index of relative abundance based on frequency of catches (I_l) should be derived from as much data as possible, but must use a consistent string length - in this case limited to five skates as fished in 2007 and 2008.

3.4.2 Relative Abundance Index, Median Catch Rate

For the four commonly caught rockfish species, the $\log_2$ transformed median catch per unit effort (of non-zero catches) from all skates fished are shown in Table 10 for 2003 to 2010.

For the index of relative abundance based on median catch rates (R_l) based on all skates fished, the change in CPUE from year to year is nearly zero, except in the case of Quillback Rockfish which shows an increase in CPUE (p-value = 0.091). The series growth rate in the last eight years of the survey is +8%, +17%, and -24%, for Redbanded, Yelloweye, and Rougheye Rockfish, respectively (Figure 11, 12, and 13). The series growth rate for Quillback Rockfish is +118%, but this value may be unduly influenced by two low median CPUE values at the beginning of the series in 2003 and 2004 (Figure 14). Catch rates for Rougheye and Quillback Rockfish appear more variable between years and more skewed than for the other two species. These characteristics may be explained in part by the depths surveyed, which are shallower than the maximum depth range of Rougheye Rockfish, and slightly deeper than the minimum depth range of Quillback Rockfish.

3.4.3 Catch Rate Trends by Station

Changes in the catch rate (U), based on all skates fished, at each station over the 2003 to 2010 time series are mapped for the four commonly caught rockfish species in Figures 15 through 18. For all stations the number of positive catches over the time series is indicated. The slope of the regression is shown for stations with more than 3 positive catches and for which the residual standard error of the regression (σ) is less than 1.3, thereby excluding stations showing higher variability in catches.

Catches of Redbanded Rockfish (Figure 15) have increased relatively steeply at two stations: 2078 – located at the head of Queen Charlotte Sound, and 2160 – located NE of Haida Gwaii in Dixon Entrance. There is a clear declining trend at station 2015 near La

Perouse Bank off the west coast of Vancouver Island. For Yelloweye Rockfish (Figure 16), catch rates tend to be either increasing or steady in the vicinity of Scott Islands and Goose Island Bank in Queen Charlotte Sound. Rougheye Rockfish catch rates (Figure 17) are increasing at station 2163 in Dixon Entrance and station 2086 at the head of Queen Charlotte Sound, and decreasing or steady elsewhere. For Quillback Rockfish no distinctive pattern is readily apparent (Figure 18).

Table 11 presents a summary of the number of stations with positive catches of the four commonly caught rockfish and with catch rates exhibiting low variability, based on all skates fished. Redbanded Rockfish have been caught at 88 stations at least once over the series and have been caught in more than three years at 76 of these stations. Although Yelloweye Rockfish have been caught at 108 stations at least once over the series, their occurrence is less regular. They have only been caught in more than three years at 65 of these stations. Rougheye and Quillback Rockfish appear far less frequently than the other two species in the IPHC SSA surveys.

3.4.4 Relative Abundance Index, Frequency of Catches

The positive catch rate from the first 5 skates at all stations in 2003 to 2010 ranges from a high of 43% of stations for Redbanded Rockfish in 2008 and 2009 to a low of 10% for Rougheye Rockfish in 2003 and 2006 (Table 10).

The index of relative abundance based on frequency of catches (I_f), shown in the lower panels of Figures 11 through 14, has changed only slightly over the 2003 to 2010 time series. Using data from the first 5 skates at each station, the annual average change is +0.07%, +0.26%, -0.04%, and +0.23% for Redbanded, Yelloweye, Rougheye, and Quillback Rockfish, respectively.

SUMMARY

The abundance indices for the 2003 – 2010 series appear to be stable and mostly flat for the four commonly caught rockfish. Series growth of non-zero catch rates and proportion of positive catches suggest only small changes in the relative abundances of these species.

The IPHC SSA Halibut survey provides valuable, fishery-independent relative abundance indices for commonly caught rockfish. There is no other coastwide, long-term abundance index available for these rockfish species. This survey may also provide similar indices for other species commonly caught on longline gear, such as Dogfish and Sablefish.

ACKNOWLEDGEMENTS

We thank the IPHC staff for their assistance with at-sea data collection, office data management and project facilitation. A special thanks to Aaron Ranta and Eric Soderlund for their extra efforts on this project. Dean Gaidica, Crystal Peterson, Suzanne Romaine, Dan Rotkin, Jay Sitar, Sarah Stephens, and Andrew Vatter are acknowledged for their individual efforts onboard the charter vessels. The staff of the PBS Groundfish data management unit provided exemplary service. Thank-you to the IPHC charter vessel skippers and crews for their care and assistance during the survey–skipper Rob Stanley and his crew Dan Johnson, Dan Nelson, Peter Amero onboard the *F/V Vanisle*, and skipper Chuck Harper, relief skipper Tom Chipman, and their crew Nolan Harper, Mark Haines, Dave Hicks, Murray Steer, and Sean Kemp onboard the *F/V Proud Venture*. We also thank Rowan Haigh for reviewing this document.

REFERENCES

Bannerot, S.P. and Austin, C.B. 1983. Using Frequency Distributions of Catch per Unit Effort to Measure Fish-Stock Abundance. Trans. Amer. Fish. Soc 112: 608-617.

Clark, W.G. and Hare, S.R. 2006. Assessment and management of Pacific halibut: data, methods, and policy. International Pacific Halibut Commission Scientific Report No. 83. http://ww.iphc.int/publications/scirep/SciReport0083.pdf, accessed 2012-02-21

Fisheries and Oceans Canada. 2006. Pacific Region: Integrated Fisheries Management Plan Groundfish, April 1, 2006 to March 31, 2007. 21 p.

Flemming, R.G., Yamanaka, K.L., Cooke, K., and Dykstra C., 2011. Summary of non-halibut catch from the Standardized Stock Assessment Survey conducted by the International Pacific Halibut Commission in British Columbia from May 28 to July 20, 2009. Can. Tech. Rep. Fish. Aquat. Sci 2971: viii + 87 p.

International Pacific Halibut Commission Homepage. 2012. www.iphc.washington.edu.

Lochead, J.K., Yamanaka, K.L., and Dykstra, C. 2006. Summary of non-halibut catch from the Standardized Stock Assessment Survey conducted by the International Pacific Halibut Commission in British Columbia from June 1 to August 12, 2004. Can. Tech. Rep. Fish. Aquat. Sci. 2657: ix + 52 p.

Obradovich, S.G., Yamanaka, K.L., Cooke, K., Lacko, L.C., and Dykstra, C. 2008. Summary of Non-Halibut Catch from the Standardized Stock Assessment Survey Conducted by the International Pacific Halibut Commission in British Columbia from June 4 to July 7, 2007. Can. Tech. Rep. Fish. Aquat. Sci. 2807: x + 83 p.

Orr, J. W. and Hawkins, S. 2008. Species of the rougheye rockfish complex: resurrection of *Sebastes melanostictus* (Matsubara, 1934) and a redescription of *Sebastes aleutianus* (Jordan and Evermann, 1898) (Teleostei: Scorpaeniformes). *U.S. National Marine Fisheries Service Fishery Bulletin*, 106: 111–134.

Schnute, J, Haigh R., Krishka B., Sinclair, A. and P. Starr. 2004. The British Columbia longspine thornyhead fishery: analysis of survey and commercial data (1996-2003). Can. Sci. Adv. Secretariat, Res. Doc. 2004/059, 75 p.

Yamanaka, K.L., Lochead, J.K., and Dykstra, C. 2004. Summary of non-halibut catch from the standardized stock assessment survey conducted by the International Pacific Halibut Commission in British Columbia from May 27 to August 11, 2003. Can. Tech. Rep. Fish. Aquat. Sci. 2535: iv + 53 p.

Yamanaka, K.L., Lochead, J.K., Cooke, K., Lacko, L.C., and Dykstra, C. 2007. Summary of non-halibut catch from the standardized stock assessment survey conducted by the International Pacific Halibut Commission in British Columbia from May 31 to July 24, 2005. Can. Tech. Rep. Fish. Aquat. Sci. 2689: vii +55 p.

Yamanaka, K.L., Obradovich, S.G., Cooke, K., Lacko, L.C., and Dykstra, C. 2008. Summary of non-halibut catch from the Standardized Stock Assessment Survey conducted by the International Pacific Halibut Commission in British Columbia from May 29 to July 22, 2006. Can. Tech. Rep. Fish. Aquat. Sci. 2796: viii+58 p.

Yamanaka, K.L., Flemming, R.G., Cooke, K., and Dykstra C., 2011. Summary of non-halibut catch from the Standardized Stock Assessment Survey conducted by the International Pacific Halibut Commission in British Columbia from May 28 to August 12, 2008. Can. Tech. Rep. Fish. Aquat. Sci. 2970: viii + 81 p.

Table 1. Summary of species catch brought on board in numbers (descending order) and as a percent of total marine fish species for the BC coast, and in numbers by each PSMFC area. Rockfish are highlighted.

Common Name	**Taxonomic Name**	**Total**	**3C/D, 5A**	**5B**	**5C/D**	**5E**	**% Total**
North Pacific Spiny Dogfish	*Squalus suckleyi*	17560	9291	3706	4417	146	43.22
Pacific Halibut	*Hippoglossus stenolepis*	10645	2917	2723	4233	772	26.20
Sablefish	*Anoplopoma fimbria*	4076	1157	1309	1268	342	10.03
Arrowtooth Flounder	*Reinhardtius stomias*	2012	536	497	968	11	4.95
Yelloweye Rockfish	***Sebastes ruberrimus***	**1731**	**280**	**931**	**341**	**179**	**4.26**
Redbanded Rockfish	***Sebastes babcocki***	**1603**	**226**	**327**	**896**	**154**	**3.95**
Longnose Skate	*Raja rhina*	1385	368	462	539	16	3.41
Sunflower Starfish	*Pycnopodia helianthoides*	461	153	76	211	21	˙
Lingcod	*Ophiodon elongatus*	324	141	75	90	18	0.80
Quillback Rockfish	***Sebastes maliger***	**248**	**83**	**20**	**113**	**32**	**0.61**
Big Skate	*Raja binoculata*	221	94	29	95	3	0.54
Shortspine Thornyhead	***Sebastolobus alascanus***	**170**	**2**	**73**	**63**	**32**	**0.42**
Rougheye Rockfish	***Sebastes aleutianus***	**156**	**7**	**41**	**47**	**61**	**0.38**
Pacific Cod	*Gadus macrocephalus*	149	11	14	122	2	0.37
Silvergray Rockfish	***Sebastes brevispinis***	**85**	**11**	**27**	**28**	**19**	**0.21**
Starfish	*Asteroidea*	79	42	17	18	2	˙
Radiata	*Radiata*	41		26	15		˙
Scallop	*Pectinidae*	35	35				˙
Spotted Ratfish	*Hydrolagus colliei*	34	10	7	9	8	0.08
Canary Rockfish	***Sebastes pinniger***	**33**	**12**	**5**	**10**	**6**	**0.08**
Octopus	*Octopoda*	32	11	6	14	1	˙
Tope Shark	*Galeorhinus galeus*	25	21	2	2		0.06
Fish-Eating Star	*Stylasterias forreri*	24			18	6	˙
Anemone	*Actiniaria*	21	11	5	5		˙
Butter Sole	*Isopsetta isolepis*	20	12	3	5		0.05
Aleutian Skate	*Bathyraja aleutica*	19		3	16		0.05
Petrale Sole	*Eopsetta jordani*	19			19		0.05
Shortraker Rockfish	***Sebastes borealis***	**17**	**7**	**4**	**2**	**4**	**0.04**
Blue Shark	*Prionace glauca*	15	2	8	5		0.04
Bocaccio	***Sebastes paucispinis***	**15**	**4**	**2**	**6**	**3**	**0.04**
Inanimate Object(s)	*Inanimate object(s)*	11	1	6	4		˙
Roughtail Skate	*Bathyraja trachura*	10	10				0.02
Anthozoa	*Anthozoa*	8	2	3	2	1	˙
Sponges	*Porifera*	8		4	3	1	˙
Walleye Pollock	*Theragra chalcogramma*	8		2	6		0.02
Gastropods	*Gastropoda*	7	6			1	˙
Flathead Sole	*Hippoglossoides elassodon*	6	3			3	0.01
Sea Urchins	*Echinacea*	5	3	1	1		˙
Pacific Sleeper Shark	*Somniosus pacificus*	5	1	1	3		0.01
Pacific Grenadier	*Coryphaenoides acrolepis*	4	3		1		0.01
Bluntnose Sixgill Shark	*Hexanchus griseus*	4	4				0.01
Sea Cucumbers	*Holothuroidea*	4		1	2	1	˙
Sea Pens	*Pennatulacea*	4	2		2		˙
Copper Rockfish	***Sebastes caurinus***	**4**	**1**		**3**		**0.01**
Yellowmouth Rockfish	***Sebastes reedi***	**4**	**2**	**2**			**0.01**
Wolf Eel	*Anarrhichthys ocellatus*	3	2	1			0.01
Basket Stars	*Euryalina*	3	2	1			˙
Greenlings	*Hexagrammidae*	3	3				0.01
Sandpaper Skate	*Bathyraja interrupta*	2			1	1	0.00
Giant Wrymouth	*Cryptacanthodes giganteus*	2		1	1		0.00
Skates	*Rajidae*	2			2		0.00
Greenstriped Rockfish	***Sebastes elongatus***	**2**	**1**	**1**			**0.00**
Unidentified Organic Matter	*Unknown*	2		2			˙
Sculpins	*Cottidae*	1	1				0.00
Glass Sponges	*Hexactinellida*	1		1			˙
Invertebrates	*Invertebrates*	1				1	˙
Southern Rock Sole	*Lepidopsetta bilineata*	1	1				0.00
Box Crabs	*Lopholithodes*	1			1		˙
Dover Sole	*Microstomus pacificus*	1			1		0.00
Chinook Salmon	*Oncorhynchus tshawytscha*	1	1				0.00
Right-Handed Hermits	*Paguridae*	1				1	˙
Yellowtail Rockfish	***Sebastes flavidus***	**1**			**1**		**0.00**
China Rockfish	***Sebastes nebulosus***	**1**	**1**				**0.00**
Rockfishes	***Sebastinae***	**1**				**1**	**0.00**
Unknown Fish	Unknown fish	1				1	0.00
Marine Fish Only		**40629**	**15226**	**10276**	**13313**	**1814**	**100.00**
Total Catch		**41378**	**15494**	**10425**	**13609**	**1860**	

N.B. this table includes second species caught on the same hook, and thus reports higher catch than table 3.

Table 2. Summary of species catch identified but escaped before being brought on board ("lost at the roller") in numbers (descending order) and as a percent of total marine fish species for the BC coast and in numbers by each PSMFC area.

Common Name	Taxonomic name	Total	3C/D, 5A	5B	5C/D	5E	% Total Marine Fish Catch
Pacific Halibut	*Hippoglossus stenolepis*	139	38	37	52	12	0.34
Redbanded Rockfish	*Sebastes babcocki*	22	3	4	14	1	0.05
Yelloweye Rockfish	*Sebastes ruberrimus*	13	1	5	3	4	0.03
Rougheye Rockfish	*Sebastes aleutianus*	3	1	1		1	0.01
Quillback Rockfish	*Sebastes maliger*	3			2	1	0.01
Canary Rockfish	*Sebastes pinniger*	2	2				0.00
Shortspine Thornyhead	*Sebastolobus alascanus*	2		1	1		0.00
North Pacific Spiny Dogfish	*Squalus suckleyi*	2	2				0.00
Sablefish	*Anoplopoma fimbria*	1	1				0.00
Silvergray Rockfish	*Sebastes brevispinis*	1	1				0.00
China Rockfish	*Sebastes nebulosus*	1	1				0.00
Marine Fish Only		**189**	**60**	**48**	**72**	**19**	**0.47**
Total Lost At The Roller		**189**	**60**	**48**	**72**	**19**	

Table 3. Total landed weight (kg) by species for the BC stations in the 2010 IPHC survey. Weights are for fresh, round fish, converted automatically and provided by the Groundfish Section front-end to the Fisheries Operating System database (GFFOS).

Species	Kilograms
Pacific Halibut	61,878
Yelloweye Rockfish	8,110
Redbanded Rockfish	3,849
Rougheye Rockfish	348
Pacific Cod	335
Quillback Rockfish	292
Shortspine Thornyhead	254
Silvergray Rockfish	196
Shortraker Rockfish	110
Canary Rockfish	75
Bocaccio	57
Dusky Rockfish	5
Northern Rockfish	4
Yellowmouth Rockfish	3
Yellowtail Rockfish	2
Greenstriped Rockfish	2
Copper Rockfish	2
Sablefish	2
China Rockfish	1
ALL ROCKFISH	13,310

Table 4. Summary of hook observations by description, DFO GFBio database code, number of hooks retrieved, and percent of total hooks.

HOOK YIELD

Description	GFBio Code	# hooks	% of total
Unknown	0	0	0.00
Empty hook	1	57,328	42.34
Bait on hook	2	15,863	11.72
Animal on hook (fish or invertebrate)	3	40,574	29.97
Species dropped off hook	5	188	0.14
Bait skin on hook	6	20,743	15.32
Eaten or bitten (by shark, etc.)	8	699	0.52
Total		**135,395**	**100.00**

HOOK CONDITION

Description	GFBio Code	# hooks	% of total
Unknown	0	0	0.00
Missing	1	857	0.63
Normal	6	134,538	99.37
Total		**135,395**	**100.00**

LINE CONDITION

Description	GFBio Code	# hooks	% of total
Normal	1	133,285	98.44
Snarl in line	2	2,089	1.54
Gear parted	4	21	0.02
Total		**135,395**	**100.00**

N.B. Table counts do not include second animals/inanimate objects caught on the same hook.

Table 5. Number of hooks deployed and summary of line snarls, including the total number and percentage of hooks involved in snarls each year, for 2003 to 2010.

YEAR	Number of Skates per Set	Number of Hooks Deployed	Total Number of Snarls	Number of Hooks Per Snarl				Total Number of Hooks Involved	% hooks involved
				Average	Minimum	Maximum	Standard Deviation		
2003	8	134,956	294	1.44	1	15	1.59	423	0.31
2004	8	135,288	547	3.13	1	57	4.22	1711	1.26
2005	7	118,897	426	3.03	1	111	6.09	1291	1.09
2006	6	101,273	281	4.05	1	72	6.54	1139	1.12
2007	5	84,231	243	4.24	1	66	6.52	1030	1.22
2008	5	83,695	189	5.86	1	45	7.91	1107	1.32
2009	7	118,212	448	3.25	1	77	5.77	1456	1.23
2010	8	135,395	747	2.80	1	54	3.24	2089	1.54

Table 6. Number of specimens, by species, measured for length, examined for sex and maturity state, and with otoliths removed for ageing.

Species	Lengths	Weights	Sex	Maturities	Otoliths
Yelloweye Rockfish	1727	1727	1665	1655	1691
Redbanded Rockfish	1598	1597	1495	1493	1517
Quillback Rockfish	246	246	245	245	246
Rougheye Rockfish	149	149	146	145	149
Silvergray Rockfish	87	87	87	87	87
Shortspine Thornyhead	75	75	0	0	0
Canary Rockfish	33	33	33	33	33
Shortraker Rockfish	19	19	18	18	19
Bocaccio	14	14	14	14	14
Yellowmouth Rockfish	4	4	4	4	4
Copper Rockfish	4	4	4	4	4
Greenstriped Rockfish	2	2	2	2	2
Yellowtail Rockfish	1	1	1	1	1
Rosethorn Rockfish	1	1	1	1	0
China Rockfish	1	1	1	1	1
All rockfish	**3961**	**3960**	**3716**	**3703**	**3768**

Table 7. Summary of rockfish fork length (round, cm) of all rockfishes for entire BC coast (IPHC area 2B) and by PSFMC area.

	Bocaccio					Canary Rockfish				
	All Areas	3C/D, 5A	5B	5C/D	5E	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	70	66	72	74	70	49	50	56	48	43
Standard Error	2.23	6.64	1.00	2.14	4.81	1.37	2.38	2.04	2.39	2.22
Median	72	72	72	73	67	51	53	57	50	41
Mode	73	multimodal	71,73	69	63,67,79	53	42,53,56	multimodal	53	40
Standard Deviation	8.34	13.28	1.41	4.77	8.33	7.89	8.25	4.56	7.56	5.43
Sample Variance	69.60	176.25	2.00	22.80	69.33	62.18	68.06	20.80	57.12	29.47
Minimum	46	46	71	69	63	35	37	49	35	37
Maximum	79	74	73	79	79	62	62	60	58	52
Range	33	28	2	10	16	27	25	11	23	15
Count	14	4	2	5	3	33	12	5	10	6

	China Rockfish					Copper Rockfish				
	All Areas	3C/D, 5A	5B	5C/D	5E	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	37	37	-	-	-	41	43	40	-	-
Standard Error	-	-	-	-	-	1.50	-	1.76	-	-
Median	37	37	-	-	-	41	43	39	-	-
Mode	37	37	-	-	-	43	43	37,39,43	-	-
Standard Deviation	-	-	-	-	-	3.00	-	3.06	-	-
Sample Variance	-	-	-	-	-	9.00	-	9.33	-	-
Minimum	37	37	-	-	-	37	43	37	-	-
Maximum	37	37	-	-	-	43	43	43	-	-
Range	0	0	-	-	-	6	0	6	-	-
Count	1	1	-	-	-	4	1	3	-	-

	Greenstriped Rockfish					Quillback Rockfish				
	All Areas	3C/D, 5A	5B	5C/D	5E	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	31	32	30	-	-	39	40	39	38	37
Standard Error	1.00	-	-	-	-	0.19	0.28	0.86	0.27	0.41
Median	31	32	30	-	-	39	41	40	38	38
Mode	30,32	32	30	-	-	38	41,42	40,42	37,38	38
Standard Deviation	1.41	-	-	-	-	2.94	2.56	3.85	2.80	2.34
Sample Variance	2.00	-	-	-	-	8.66	6.56	14.80	7.82	5.48
Minimum	30	32	30	-	-	28	35	28	31	32
Maximum	32	32	30	-	-	46	46	45	45	41
Range	2	0	0	-	-	18	11	17	14	9
Count	2	1	1	-	-	246	83	20	111	32

	Redbanded Rockfish					Rosethorn Rockfish				
	All Areas	3C/D, 5A	5B	5C/D	5E	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	50	49	48	51	50	23	23	-	-	-
Standard Error	0.14	0.33	0.30	0.18	0.42	-	-	-	-	-
Median	50	49	47	51	50	23	23	-	-	-
Mode	49	51	45	53	51	23	23	-	-	-
Standard Deviation	5.40	5.00	5.51	5.29	5.21	-	-	-	-	-
Sample Variance	29.19	25.03	30.37	28.02	27.14	-	-	-	-	-
Minimum	29	34	31	29	37	23	23	-	-	-
Maximum	66	62	64	66	64	23	23	-	-	-
Range	37	28	33	37	27	0	0	-	-	-
Count	1598	224	327	894	153	1	1	-	-	-

Table 7 continued on next page

Table 7 continued

Rougheye Rockfish	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	51	52	49	52	52
Standard Error	0.53	3.41	0.87	0.99	0.86
Median	51	51	50	51	52
Mode	48	51	50	48	54
Standard Deviation	6.48	9.02	5.67	6.77	6.23
Sample Variance	42.02	81.33	32.11	45.79	38.80
Minimum	33	43	33	37	40
Maximum	72	70	59	67	72
Range	39	27	26	30	32
Count	149	7	42	47	53

Shortraker Rockfish	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	73	69	80	83	70
Standard Error	3.07	6.78	4.36	9.00	3.36
Median	74	75	84	83	72
Mode	73,85	multimodal	85	74,92	73
Standard Deviation	13.39	17.95	8.72	12.73	8.24
Sample Variance	179.39	322.24	76.00	162.00	67.90
Minimum	49	49	67	74	59
Maximum	93	93	85	92	81
Range	44	44	18	18	22
Count	19	7	4	2	6

Shortspine Thornyhead	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	47	44	52	-	-
Standard Error	1.22	1.22	2.20	-	-
Median	44	42	47	-	-
Mode	39	39	44,45	-	-
Standard Deviation	10.54	8.18	12.03	-	-
Sample Variance	111.19	66.90	144.67	-	-
Minimum	33	33	36	-	-
Maximum	77	71	77	-	-
Range	44	38	41	-	-
Count	75	45	30	-	-

Silvergray Rockfish	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	55	56	54	54	58
Standard Error	0.48	1.81	0.90	0.57	0.92
Median	55	57	54	55	58
Mode	56	54	51,56	55	58
Standard Deviation	4.43	6.26	4.67	3.12	3.81
Sample Variance	19.83	39.24	21.82	9.77	14.51
Minimum	40	40	45	48	51
Maximum	64	64	62	61	64
Range	24	24	17	13	13
Count	86	12	27	30	17

Yelloweye Rockfish	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	56	56	55	56	55
Standard Error	0.13	0.33	0.18	0.32	0.44
Median	56	56	55	56	55
Mode	56	57	56	55	57
Standard Deviation	5.56	5.48	5.36	5.92	5.85
Sample Variance	30.96	30.02	28.78	35.04	34.25
Minimum	32	33	41	32	38
Maximum	76	76	70	72	69
Range	44	43	29	40	31
Count	1727	279	927	341	180

Yellowmouth Rockfish	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	48	47	48	-	-
Standard Error	0.96	1.00	2.00	-	-
Median	47	47	48	-	-
Mode	46	46,48	46,50	-	-
Standard Deviation	1.91	1.41	2.83	-	-
Sample Variance	3.67	2.00	8.00	-	-
Minimum	46	46	46	-	-
Maximum	50	48	50	-	-
Range	4	2	4	-	-
Count	4	2	2	-	-

Yellowtail Rockfish	All Areas	3C/D, 5A	5B	5C/D	5E
Mean	53	53	-	-	-
Standard Error	-	-	-	-	-
Median	53	53	-	-	-
Mode	53	53	-	-	-
Standard Deviation	-	-	-	-	-
Sample Variance	-	-	-	-	-
Minimum	53	53	-	-	-
Maximum	53	53	-	-	-
Range	0	0	-	-	-
Count	1	1	-	-	-

Table 8. Sexual maturity, assessed visually, for male and female rockfish species showing the number (proportion) of fish in each maturity stage and the total number of fish sampled.

MALE	**Proportion of Individuals in Each Maturity Stage**							**Total**
ROCKFISH	**Immature**	**Maturing**	**Developing**	**Developed**	**Running**	**Spent**	**Resting**	**N**
Bocaccio				0.75		0.13	0.13	8
Canary	0.17	0.33	0.17	0.25			0.08	12
China							1.00	1
Copper						0.50	0.50	2
Greenstriped	-	-	-	-	-	-	-	0
Quillback	0.01	0.21	0.12	0.04		0.12	0.49	114
Redbanded	0.00	0.02	0.17	0.47		0.03	0.30	615
Rosethorn	1.00							1
Rougheye	0.03	0.07	0.13	0.58		0.03	0.15	60
Shortraker		0.33		0.33			0.33	6
Silvergray		0.11	0.11			0.09	0.70	46
Yelloweye	0.03	0.14	0.07	0.01		0.23	0.52	911
Yellowmouth					0.50		0.50	2
Yellowtail	-	-	-	-	-	-	-	0
All Rockfish	0.02	0.10	0.11	0.20	0.00	0.14	0.43	1778

FEMALE	**Proportion of Individuals in Each Maturity Stage**							**Total**
ROCKFISH	**Immature**	**Maturing**	**Mature**	**Fertilized**	**Larvae**	**Spent**	**Resting**	**N**
Bocaccio						0.50	0.50	6
Canary	0.05	0.33	0.52			0.05	0.05	21
China	-	-	-	-	-	-	-	0
Copper			0.50				0.50	2
Greenstriped					0.50		0.50	2
Quillback		0.07	0.24			0.21	0.48	131
Redbanded		0.08	0.08	0.01	0.00	0.36	0.48	878
Rosethorn	-	-	-	-	-	-	-	0
Rougheye	0.04	0.24	0.11	0.01		0.12	0.49	85
Shortraker			0.08			0.67	0.25	12
Silvergray		0.07	0.05		0.07	0.39	0.41	41
Yelloweye	0.01	0.06	0.05	0.02	0.02	0.38	0.45	744
Yellowmouth							1.00	2
Yellowtail			1.00					1
All Rockfish	0.00	0.08	0.09	0.01	0.01	0.34	0.46	1925

Table 9. Summary of 2010 rockfish catch rates (numbers of fish per 100 hooks, non-zero catches) (U) for entire BC coast (IPHC area 2B) and by PSMFC area grouping.

All Areas (170 sets)	Bocaccio	Canary	China	Copper	Green-striped	Quillback	Red-banded	Rougheye	Shortraker	Silvergray	Yelloweye	Yellow-mouth	Yellowtail	Unidentified
Mean	0.231	0.203	0.120	0.163	0.120	0.949	2.701	0.783	0.300	0.341	3.272	0.163	0.120	0.120
Median	0.185	0.120	0.120	0.120	0.120	0.750	1.630	0.370	0.120	0.250	1.400	0.120	0.120	0.120
Standard Deviation	0.142	0.126		0.075	0.000	0.931	3.614	1.030	0.252	0.322	4.977	0.075		
Sample Variance	0.020	0.016		0.006	0.000	0.867	13.058	1.062	0.064	0.104	24.770	0.006		
Minimum	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120
Maximum	0.500	0.500	0.120	0.250	0.120	3.870	22.890	3.680	0.760	1.360	29.940	0.250	0.120	0.120
Positive Catch Rate	0.047	0.118	0.006	0.018	0.012	0.194	0.441	0.147	0.041	0.182	0.394	0.018	0.006	0.006
3C/D, 5A (55 Sets)														
Mean	0.245	0.213	0.120	0.120	0.120	0.764	2.044	0.218	0.440	0.196	1.715	0.250		
Median	0.245	0.250	0.120	0.120	0.120	0.570	0.505	0.185	0.440	0.120	1.260	0.250		
Standard Deviation	0.177	0.098				0.725	2.985	0.124	0.453	0.142	1.650			
Sample Variance	0.031	0.010				0.526	8.913	0.015	0.205	0.020	2.721			
Minimum	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.120	0.250		
Maximum	0.370	0.380	0.120	0.120	0.120	2.680	8.720	0.380	0.760	0.500	5.440	0.250		
Positive Catch Rate	0.036	0.127	0.018	0.018	0.018	0.255	0.255	0.073	0.036	0.127	0.362	0.018	0.000	0.000
5B (46 Sets)														
Mean	0.250	0.120			0.120	0.837	1.530	0.485	0.245	0.423	6.214	0.120		
Median	0.250	0.120			0.120	0.880	1.640	0.370	0.245	0.435	2.860	0.120		
Standard Deviation		0.000				0.317	1.214	0.412	0.177	0.245	7.963	0.000		
Sample Variance		0.000				0.101	1.475	0.170	0.031	0.060	63.725	0.000		
Minimum	0.250	0.120			0.120	0.500	0.120	0.120	0.120	0.120	0.120	0.120		
Maximum	0.250	0.120			0.120	1.130	4.690	1.510	0.370	0.760	29.940	0.120		
Positive Catch Rate	0.022	0.109	0.000	0.000	0.022	0.065	0.587	0.239	0.043	0.174	0.413	0.043	0.000	0.000
5C/D (59 Sets)														
Mean	0.247	0.244		0.185		1.007	3.781	0.988	0.120	0.348	1.940		0.120	
Median	0.120	0.240		0.185		0.620	1.865	0.375	0.120	0.185	1.060		0.120	
Standard Deviation	0.219	0.155		0.092		1.086	4.653	1.386	0.000	0.366	2.354			
Sample Variance	0.048	0.024		0.008		1.179	21.653	1.922	0.000	0.134	5.541			
Minimum	0.120	0.120		0.120		0.120	0.120	0.120	0.120	0.120	0.120		0.120	
Maximum	0.500	0.500		0.250		3.870	22.890	3.680	0.120	1.260	9.780		0.120	
Positive Catch Rate	0.051	0.085	0.000	0.034	0.000	0.237	0.508	0.102	0.034	0.169	0.373	0.000	0.017	0.000
5E (10 Sets)														
Mean	0.185	0.247				2.010	4.810	1.913	0.490	0.392	4.496			0.120
Median	0.185	0.120				2.010	3.620	2.065	0.490	0.250	3.750			0.120
Standard Deviation	0.092	0.219				1.598	5.424	1.459		0.479	3.712			
Sample Variance	0.008	0.048				2.554	29.421	2.128		0.229	13.777			
Minimum	0.120	0.120				0.880	0.250	0.120	0.490	0.120	1.130			0.120
Maximum	0.250	0.500				3.140	11.750	3.400	0.490	1.360	10.710			0.120
Positive Catch Rate	0.200	0.300	0.000	0.000	0.000	0.200	0.400	0.400	0.100	0.600	0.500	0.000	0.000	0.100

Table 10. Catch data summary for Quillback, Yelloweye, Redbanded and Rougheye Rockfish caught on the IPHC SSA survey from 2003 to 2010, for all stations fished. For each year, the number of stations fished, the total number of hooks fished, the number of fish caught, the frequency of positive catches using all data (%+, all skates), the frequency of positive catches using only data from the first 5 skates in each set (%+, 5 skates), and the $\log_2$ median catch rates of the non-zero catches using all data are reported.

			Redbanded Rockfish				Yelloweye Rockfish			
Year	# Stations with data	# Hooks	Number Caught	%+, all skates	%+, 5 skates	log2(Median Catch Rate)	Number Caught	%+, all skates	%+, 5 skates	log2(Median Catch Rate)
2003	170	134,868	1,295	41.8	37.6	0.333	1210	41.8	34.1	-0.184
2004	170	133,212	1,972	43.5	41.8	0.978	1522	40.6	33.5	0.595
2005	170	117,947	1,568	44.7	42.4	1.000	1168	40.6	36.5	0.506
2006	170	100,423	1,270	41.2	40.0	0.824	995	38.2	35.9	0.043
2007	170	83,637	724	38.8	38.8	0.491	688	32.4	32.4	0.536
2008	169	82,770	1,137	42.6	42.6	0.795	830	38.5	38.5	0.029
2009	170	117,106	1,910	44.7	42.9	0.907	1358	43.5	40.0	0.384
2010	170	134,538	1,603	44.1	38.2	0.714	1731	39.4	34.1	0.496

	Rougheye Rockfish				Quillback Rockfish			
Year	Number Caught	%+, all skates	%+, 5 skates	log2(Median Catch Rate)	Number Caught	%+, all skates	%+, 5 skates	log2(Median Catch Rate)
2003	286	12.9	10.0	-1.184	154	17.6	12.4	-1.396
2004	458	17.1	15.3	-0.168	138	13.5	11.8	-2.000
2005	536	15.9	14.1	-0.811	295	15.3	14.7	-0.234
2006	215	10.6	10.0	-0.234	195	17.1	14.7	-0.578
2007	117	11.2	11.2	-2.252	121	13.5	13.5	-0.304
2008	276	14.2	14.2	-0.128	88	14.2	14.2	-0.713
2009	366	13.5	12.9	-0.786	181	16.5	15.3	-0.474
2010	156	14.7	10.6	-1.396	248	19.4	15.3	-0.396

Table 11. Catch frequency from all skates fished at each station for Redbanded, Yelloweye, Rougheye and Quillback Rockfish caught on the IPHC SSA survey from 2003 to 2010. For each species, the number of stations at which a fish has ever been caught, the number of stations at which a fish has been caught more than 3 times, and the number of these stations at which a regression on the $\log_2$ transformed non-zero catch rate data (#fish/100 hooks) results in a standard error of the regression residuals (σ) of less than 1.3.

	Number of Stations with any catch over the 2003 to 2010 time series	Number of stations with > 3 positive catches	Number of stations with > 3 positive catches and $\sigma < 1.3$
Redbanded Rockfish	88	76	54
Yelloweye Rockfish	108	65	53
Rougheye Rockfish	44	26	14
Quillback Rockfish	49	28	21

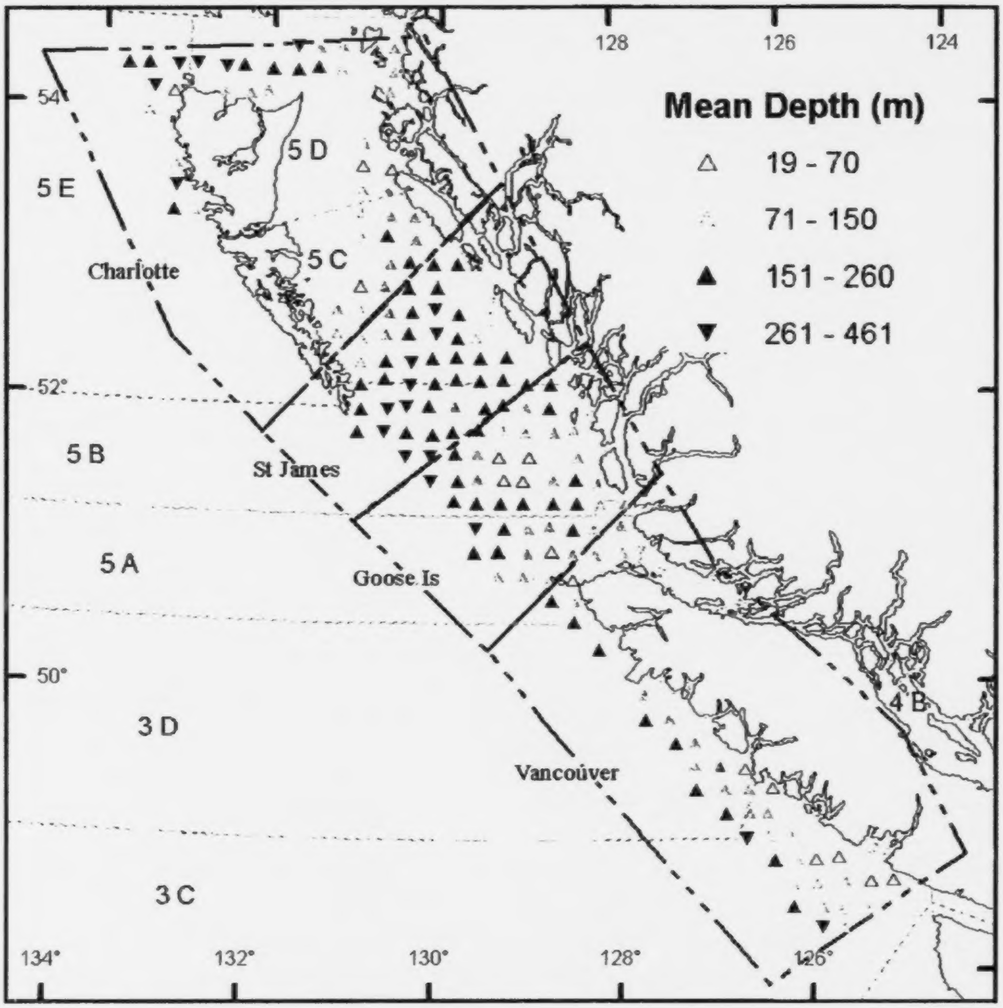

Mean Depth (m)
△ 19 - 70
▲ 71 - 150
▲ 151 - 260
▼ 261 - 461
5 E
5 D
5 C
5 B
5 A
3 D
3 C
4 B
Charlotte
St James
Goose Is
Vancouver
54°
52°
50°
134°
132°
130°
128°
126°
124

Figure 1. 2010 IPHC SSA survey stations grouped by mean depth-of-fishing in metres.

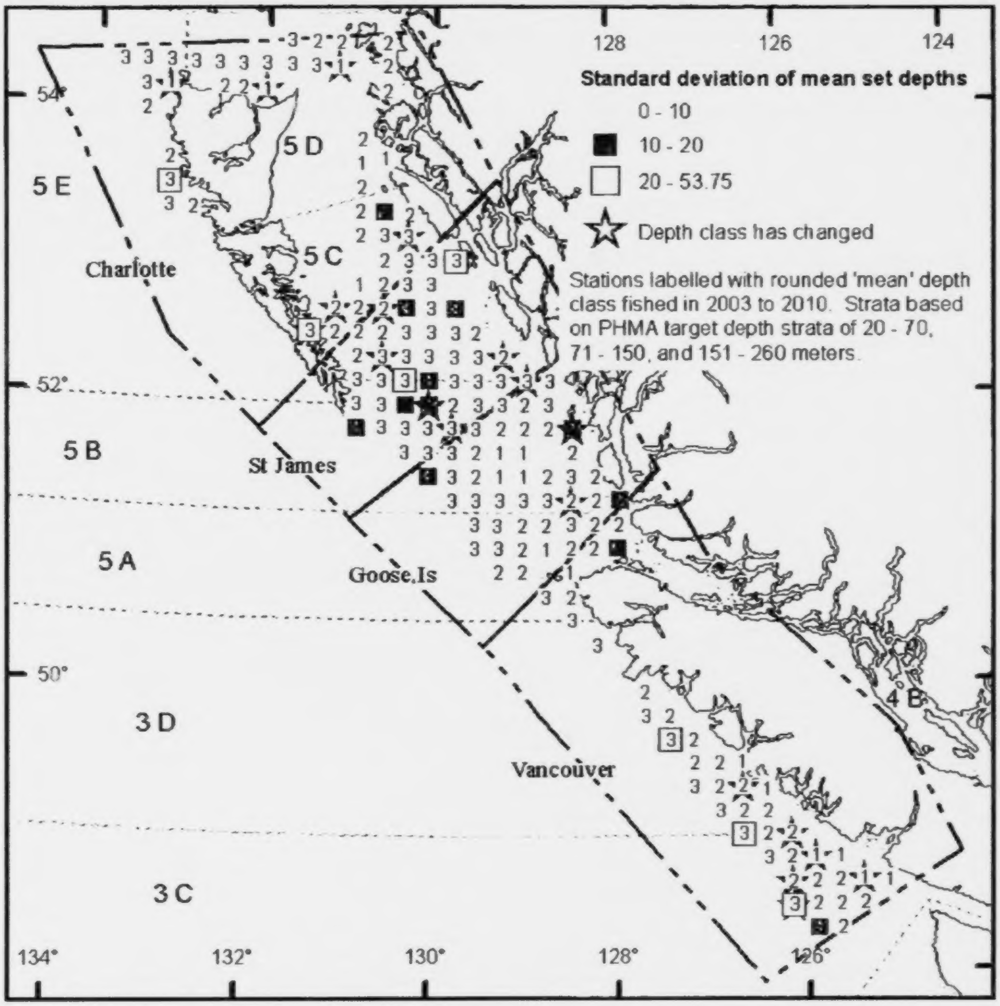

Standard deviation of mean set depths
0 - 10
10 - 20
20 - 53.75
Depth class has changed
Stations labelled with rounded 'mean' depth class fished in 2003 to 2010. Strata based on PHMA target depth strata of 20 - 70, 71 - 150, and 151 - 260 meters.
5E
5D
5C
5B
5A
3D
3C
4B
Charlotte
St James
Goose.Is
Vancouver
134°
132°
130°
128°
126°
124°
54°
52°
50°

Figure 2. Standard deviation of mean set depths from 2003 to 2010 by IPHC station, labelled with rounded average depth class based on PHMA depth strata of 20-70, 71-150, and 151-260 (or greater) metres. Stations for which the depth class has changed over the time series are indicated.

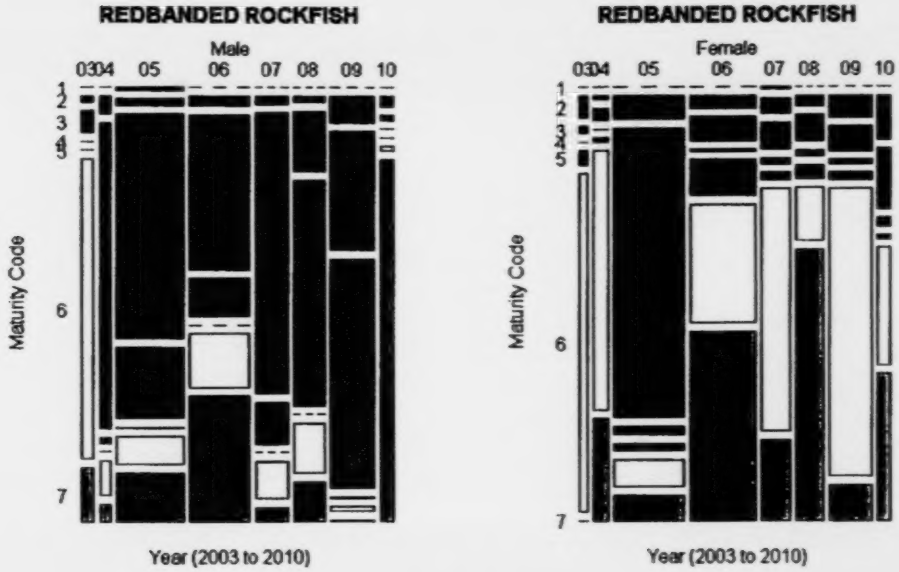


Figure 3 Relative proportions of maturity states of Redbanded Rockfish males [m] (left panel) and females [f] (right panel) caught from 2003 to 2010 in the month of June. Width of columns proportional to number of fish sampled in that month. Maturity Codes are (0) Unknown, (1) Immature, (2) Maturing, (3) Developing[m]/Mature[f], (4) Developed[m]/Fertilized[f], (5) Running[m]/Embryos[f], (6) Spent, and (7) Resting.

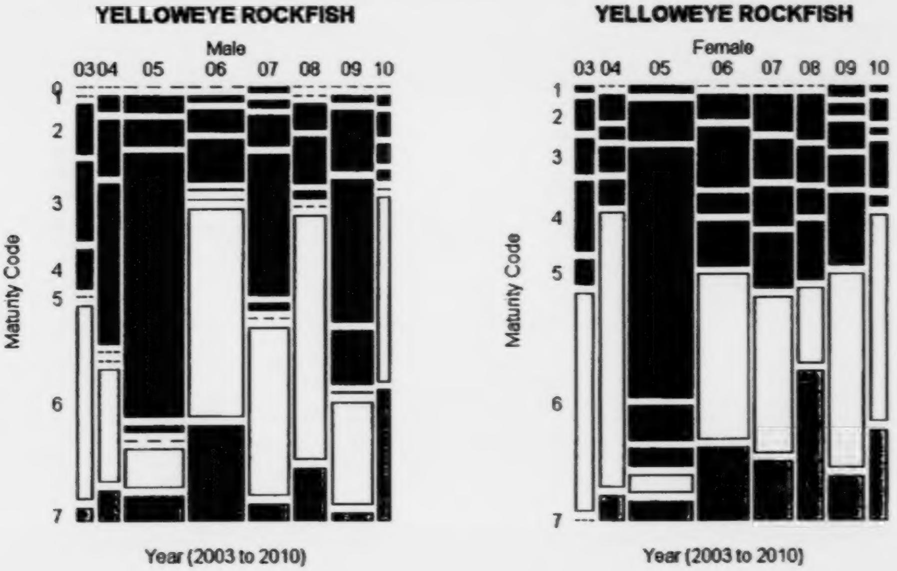


Figure 4 Relative proportions of maturity states of Yelloweye Rockfish males (left panel) and females (right panel) caught from 2003 to 2010 in the month of June. Width of columns proportional to number of fish sampled in that month. Maturity Codes are (0) Unknown, (1) Immature, (2) Maturing, (3) Developing[m]/Mature[f], (4) Developed[m]/Fertilized[f], (5) Running[m]/Embryos[f], (6) Spent, and (7) Resting.

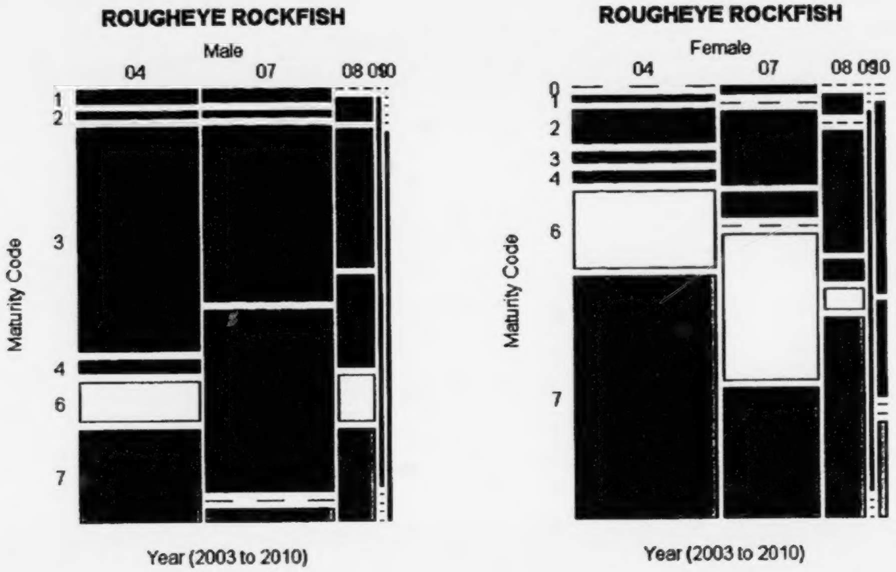


Figure 5 Relative proportions of maturity states of Rougheye Rockfish males (left panel) and females (right panel) caught from 2003 to 2010 in the month of June. Width of columns proportional to number of fish sampled in that month. Maturity Codes are (0) Unknown, (1) Immature, (2) Maturing, (3) Developing[m]/Mature[f], (4) Developed[m]/Fertilized[f], (5) Running[m]/Embryos[f], (6) Spent, and (7) Resting.

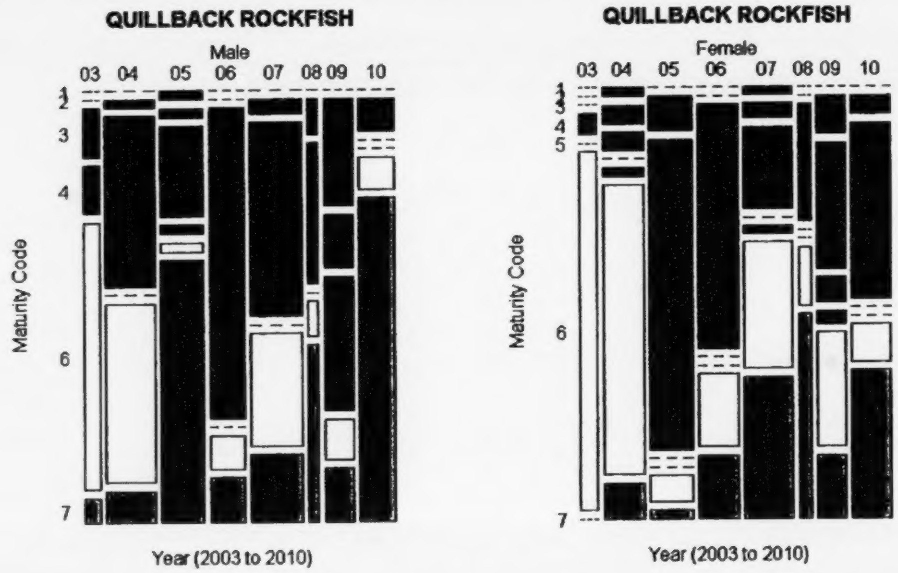


Figure 6 Relative proportions of maturity states of Quillback Rockfish males (left panel) and females (right panel) caught from 2003 to 2010 in the month of June. Width of columns proportional to number of fish sampled in that month. Maturity Codes are (0) Unknown, (1) Immature, (2) Maturing, (3) Developing[m]/Mature[f], (4) Developed[m]/Fertilized[f], (5) Running[m]/Embryos[f], (6) Spent, and (7) Resting.

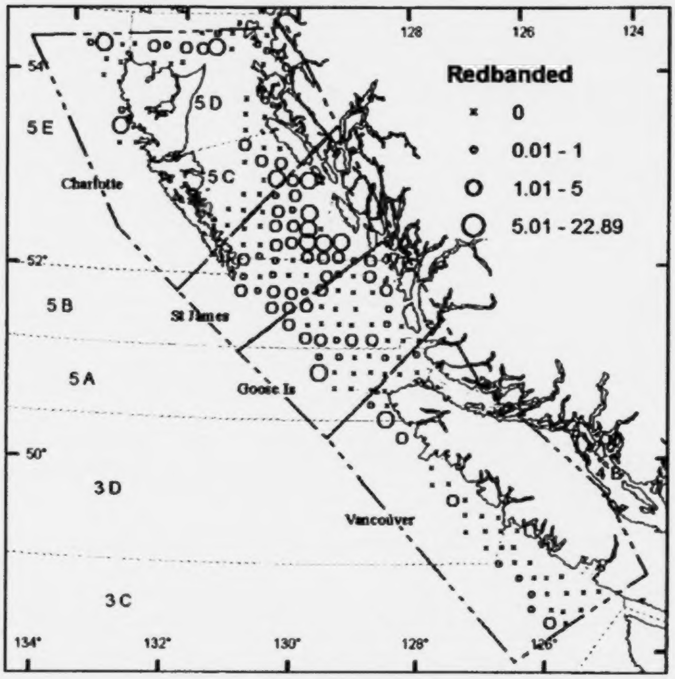

128
126
124
Redbanded
× 0
• 0.01 - 1
○ 1.01 - 5
○ 5.01 - 22.89
54°
5E
5D
Charlotte
5C
52°
5B
St James
5A
Goose Is
50°
3D
Vancouver
4B
3C
134°
132°
130°
128°
126°

Figure 7 2010 catch rate by station (*U*) of Redbanded Rockfish (in numbers of fish per 100 hooks) using data from all skates fished showing IPHC regions (heavy dashed outline) and DFO Management Areas (light dash).

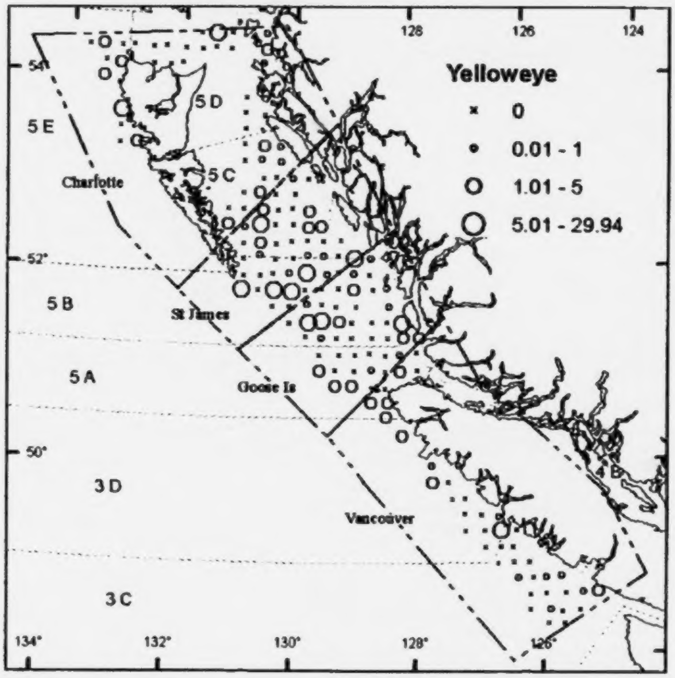

128
126
124
Yelloweye
× 0
• 0.01 - 1
○ 1.01 - 5
○ 5.01 - 29.94
54°
5E
5D
Charlotte
5C
52°
5B
St James
5A
Goose Is
50°
3D
Vancouver
4B
3C
134°
132°
130°
128°
126°

Figure 8. 2010 catch rate by station (*U*) of Yelloweye Rockfish (in numbers of fish per 100 hooks) using data from all skates fished showing IPHC regions (heavy dashed outline) and DFO Management Areas (light dash).

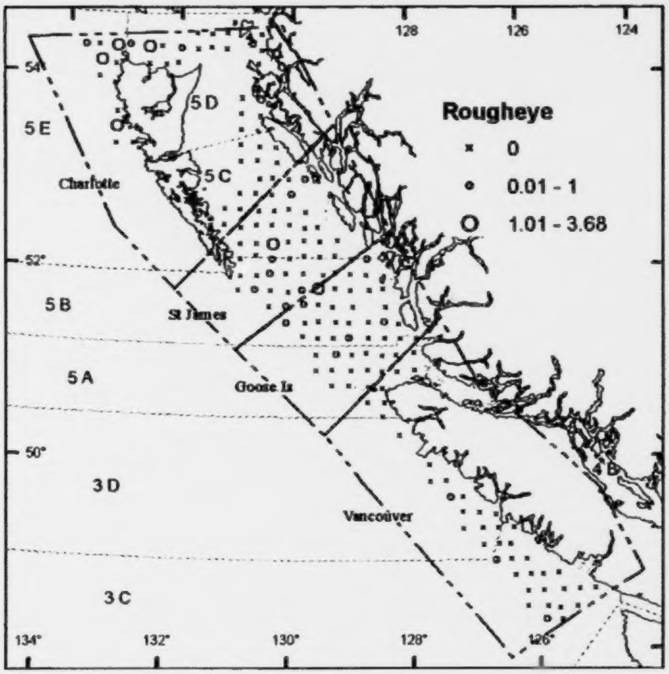

Rougheye
× 0
○ 0.01 - 1
O 1.01 - 3.68
5E
5D
5C
5B
5A
3D
3C
Charlotte
St James
Goose Is
Vancouver
54°
52°
50°
134°
132°
130°
128°
126°
128
126
124

Figure 9. 2010 catch rate by station (*U*) of Rougheye Rockfish (in numbers of fish per 100 hooks) using data from all skates fished showing IPHC regions (heavy dashed outline) and DFO Management Areas (light dash).

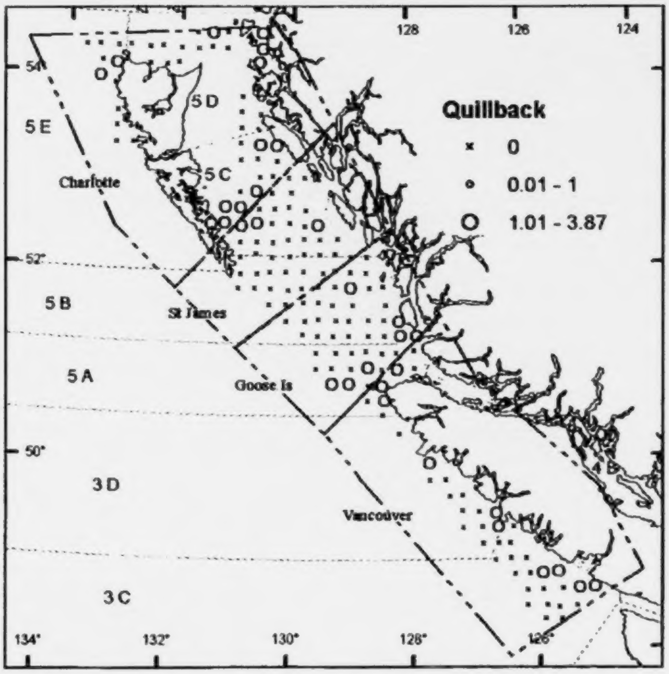

Quillback
× 0
○ 0.01 - 1
O 1.01 - 3.87
5E
5D
5C
5B
5A
3D
3C
Charlotte
St James
Goose Is
Vancouver
54°
52°
50°
134°
132°
130°
128°
126°
128
126
124

Figure 10. 2010 catch rate by station (*U*) of Quillback Rockfish (in numbers of fish per 100 hooks) using data from all skates fished showing IPHC regions (heavy dashed outline) and DFO Management Areas (light dash).

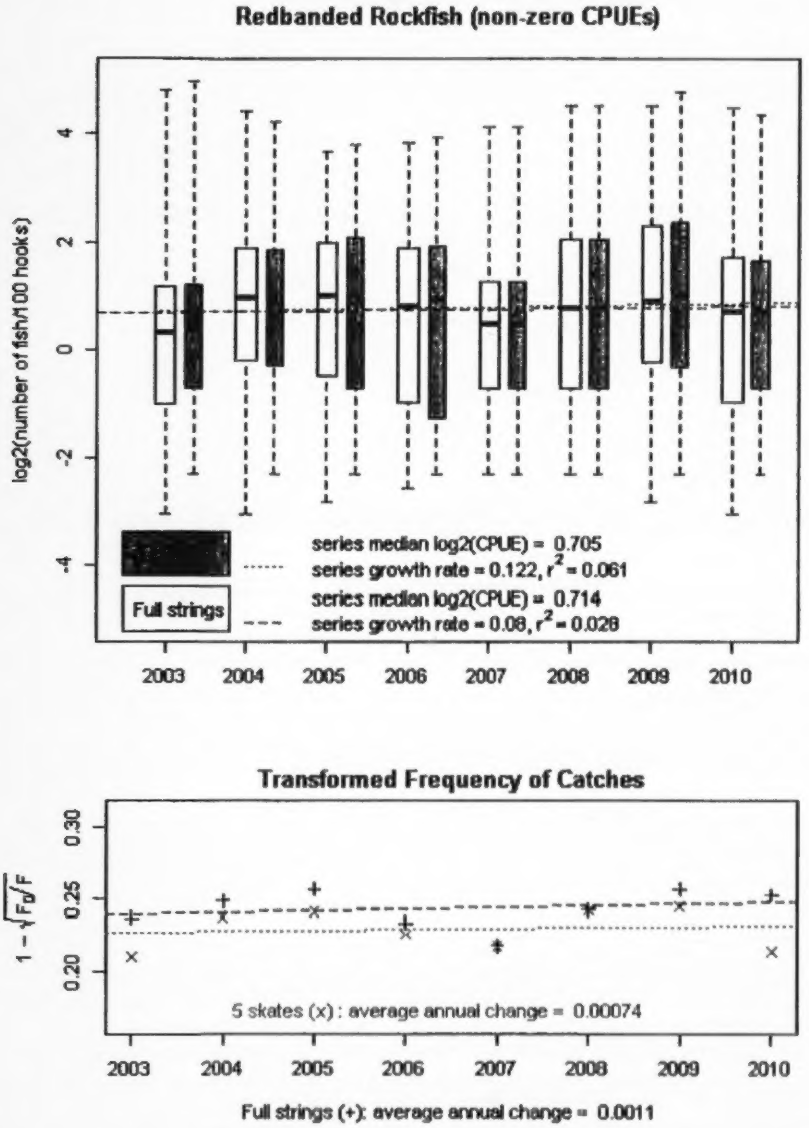


Figure 11. Redbanded Rockfish - Upper panel: index of relative abundance based on log transformed median catch rates (R_i) from 2003 to 2010. Boxplots summarize annual non-zero data with a box for the upper (75th percentile) and lower (25th percentile) hinges of the data, a bar for the median, and whiskers for the extremes of the data. Series median value is presented and the series growth rate is presented and shown as a dashed line together with the r^2 value. Lower panel: index of relative abundance based on frequency of catches (I_i) by year shown with a dashed regression line and the average annual change presented. For both panels, results from data limited to the first 5 skates fished are portrayed in green, results from the full strings fished (up to 8 skates) are portrayed in gray.

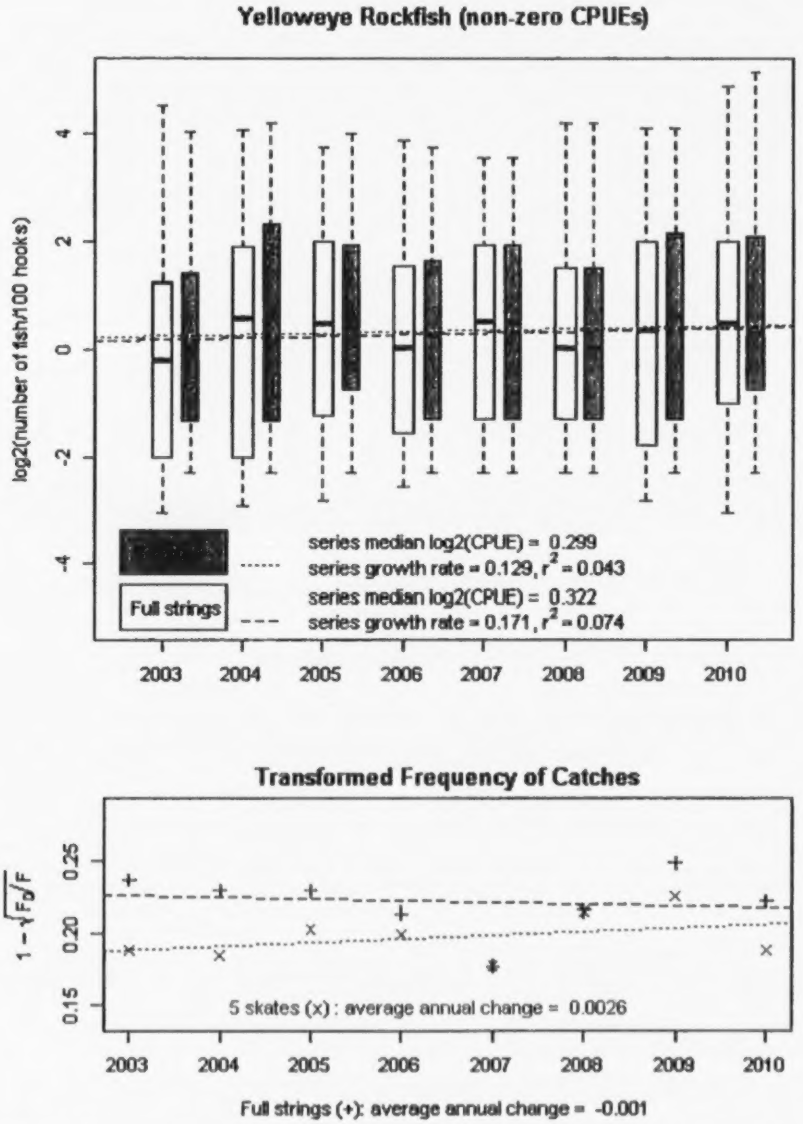


Figure 12. Yelloweye Rockfish - Upper panel: index of relative abundance based on log transformed median catch rates (R_l) from 2003 to 2010. Boxplots summarize annual non-zero data with a box for the upper (75th percentile) and lower (25th percentile) hinges of the data, a bar for the median, and whiskers for the extremes of the data. Series median value is presented and the series growth rate is presented and shown as a dashed line together with the r^2 value. Lower panel: index of relative abundance based on frequency of catches (I_l) by year shown with a dashed regression line and the average annual change presented. For both panels, results from data limited to the first 5 skates fished are portrayed in green, results from the full strings fished (up to 8 skates) are portrayed in gray.

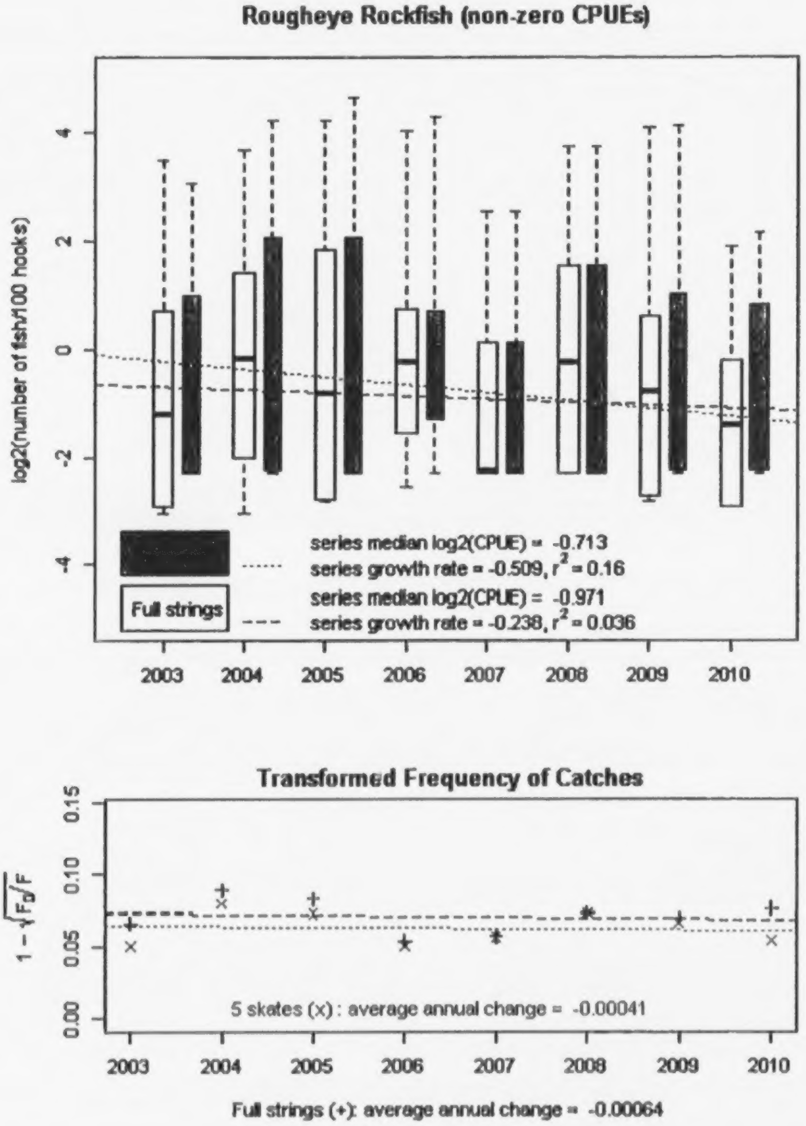


Figure 13. Rougheye Rockfish - Upper panel: index of relative abundance based on log transformed median catch rates (R_l) from 2003 to 2010. Boxplots summarize annual non-zero data with a box for the upper (75th percentile) and lower (25th percentile) hinges of the data, a bar for the median, and whiskers for the extremes of the data. Series median value is presented and the series growth rate is presented and shown as a dashed line together with the r2 value. Lower panel: index of relative abundance based on frequency of catches (I_l) by year shown with a dashed regression line and the average annual change presented. For both panels, results from data limited to the first 5 skates fished are portrayed in green, results from the full strings fished (up to 8 skates) are portrayed in gray.

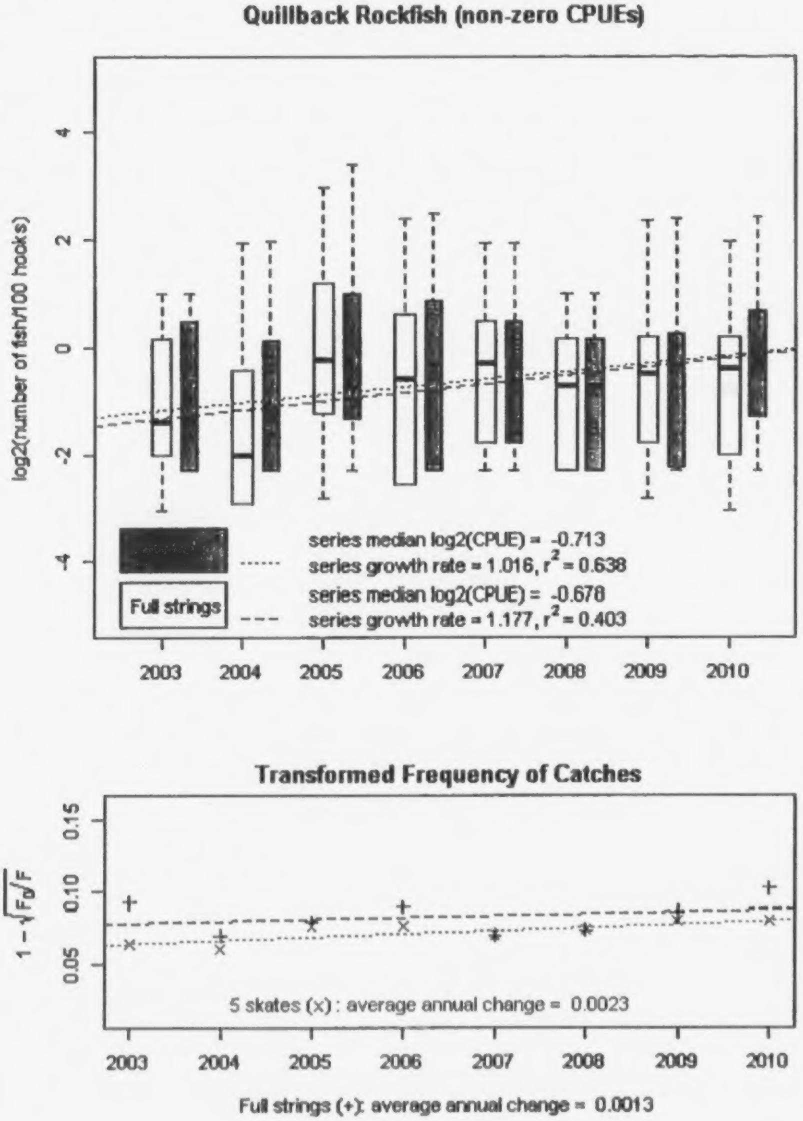


Figure 14. Quillback Rockfish - Upper panel: index of relative abundance based on log transformed median catch rates (R_l) from 2003 to 2010. Boxplots summarize annual non-zero data with a box for the upper (75th percentile) and lower (25th percentile) hinges of the data, a bar for the median, and whiskers for the extremes of the data. Series median value is presented and the series growth rate is presented and shown as a dashed line together with the r^2 value. Lower panel: index of relative abundance based on frequency of catches (I_l) by year shown with a dashed regression line and the average annual change presented. For both panels, results from data limited to the first 5 skates fished are portrayed in green, results from the full strings fished (up to 8 skates) are portrayed in gray.

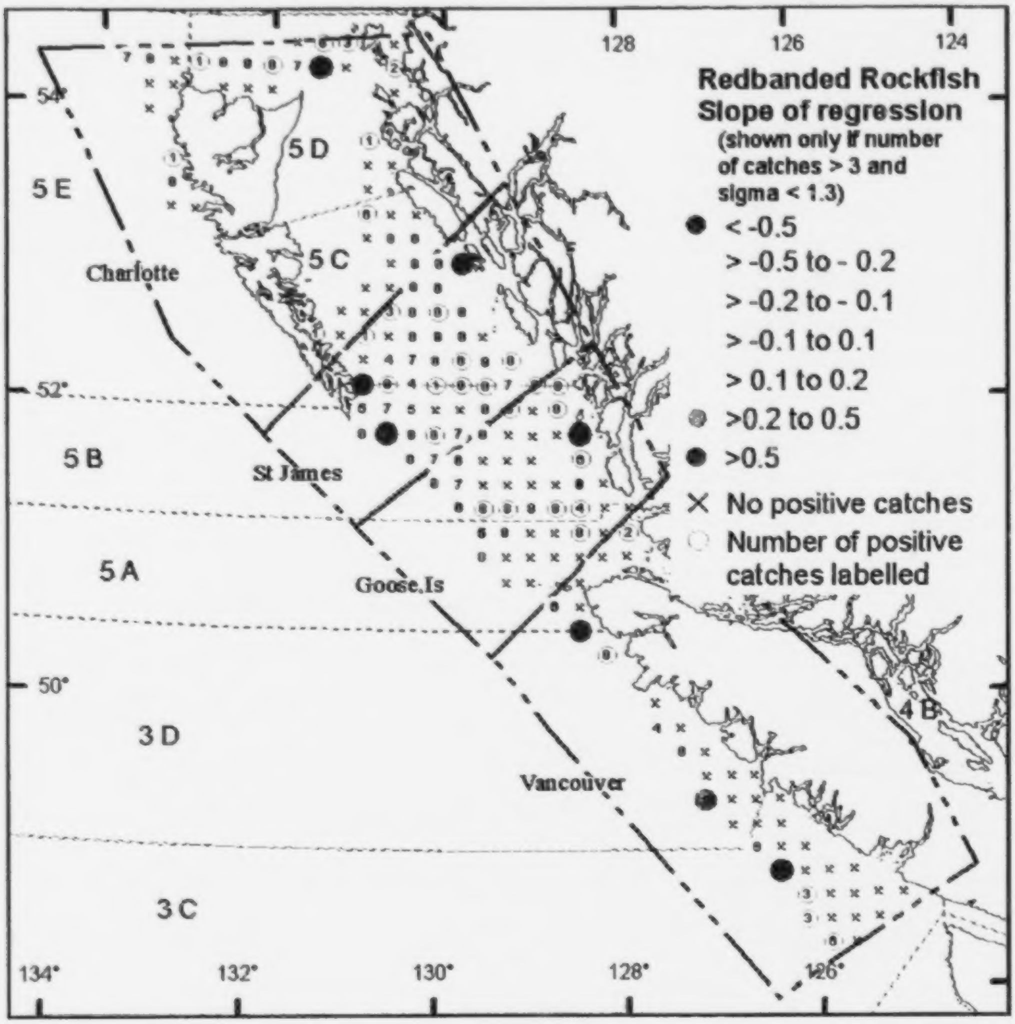

Redbanded Rockfish
Slope of regression
(shown only if number of catches > 3 and sigma < 1.3)
● < -0.5
> -0.5 to - 0.2
> -0.2 to - 0.1
> -0.1 to 0.1
> 0.1 to 0.2
● >0.2 to 0.5
● >0.5
× No positive catches
○ Number of positive catches labelled
5 E
5 D
5 C
5 B
5 A
3 D
3 C
4 B
Charlotte
St James
Goose Is
Vancouver
54°
52°
50°
134°
132°
130°
128°
126°
124

Figure 15. Redbanded Rockfish catch rate trends by station from 2003 to 2010, using data from all skates fished. For all stations the number of positive catches over the time series is labelled. The classified slope of the regression on non-zero catch rates is shown for stations with more than 3 positive catches and for which the residual standard error of the regression (σ) is less than 1.3.

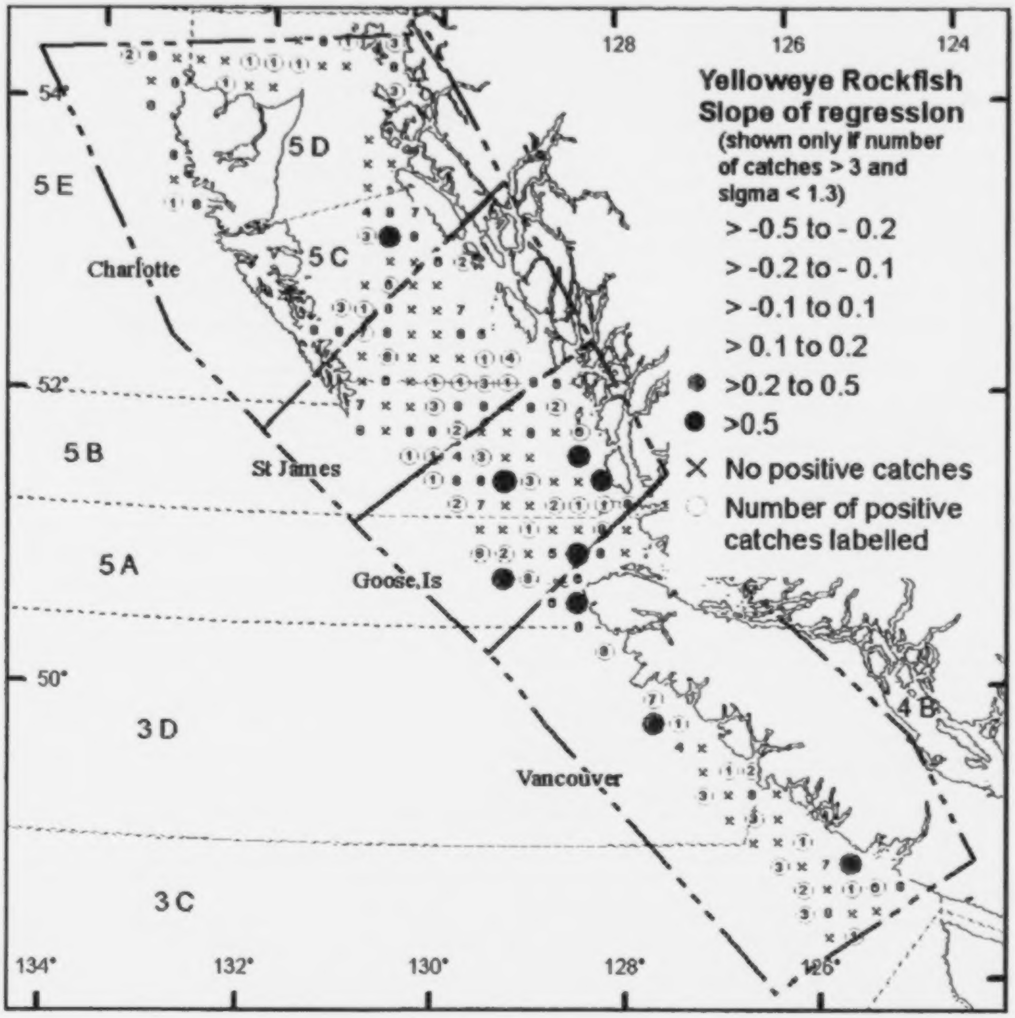

Yelloweye Rockfish
Slope of regression
(shown only if number of catches > 3 and sigma < 1.3)
> -0.5 to - 0.2
> -0.2 to - 0.1
> -0.1 to 0.1
> 0.1 to 0.2
>0.2 to 0.5
>0.5
× No positive catches
Number of positive catches labelled
5E
5D
5C
5B
5A
3D
3C
4B
Charlotte
St James
Goose.Is
Vancouver
54°
52°
50°
128
126
124
134°
132°
130°
128°
126°

Figure 16. Yelloweye Rockfish catch rate trends by station from 2003 to 2010, using data from all skates fished. For all stations the number of positive catches over the time series is labelled. The classified slope of the regression on non-zero catch rates is shown for stations with more than 3 positive catches and for which the residual standard error of the regression (σ) is less than 1.3.

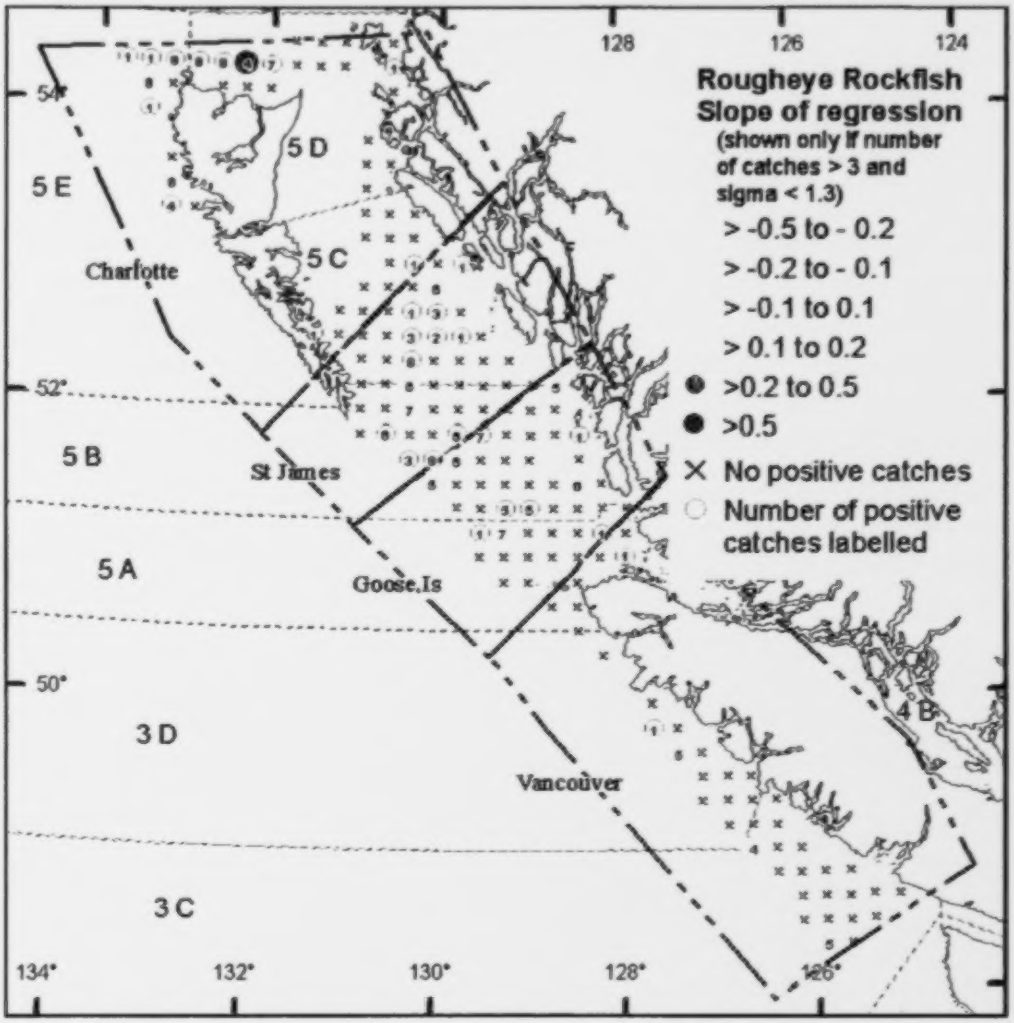

Rougheye Rockfish
Slope of regression
(shown only if number of catches > 3 and sigma < 1.3)
> -0.5 to - 0.2
> -0.2 to - 0.1
> -0.1 to 0.1
> 0.1 to 0.2
>0.2 to 0.5
>0.5
× No positive catches
Number of positive catches labelled
5E
5D
5C
5B
5A
3D
3C
4B
Charlotte
St James
Goose.Is
Vancouver
54°
52°
50°
134°
132°
130°
128°
126°
124°

Figure 17. Rougheye Rockfish catch rate trends by station from 2003 to 2010, using data from all skates fished. For all stations the number of positive catches over the time series is labelled. The classified slope of the regression on non-zero catch rates is shown for stations with more than 3 positive catches and for which the residual standard error of the regression (σ) is less than 1.3.

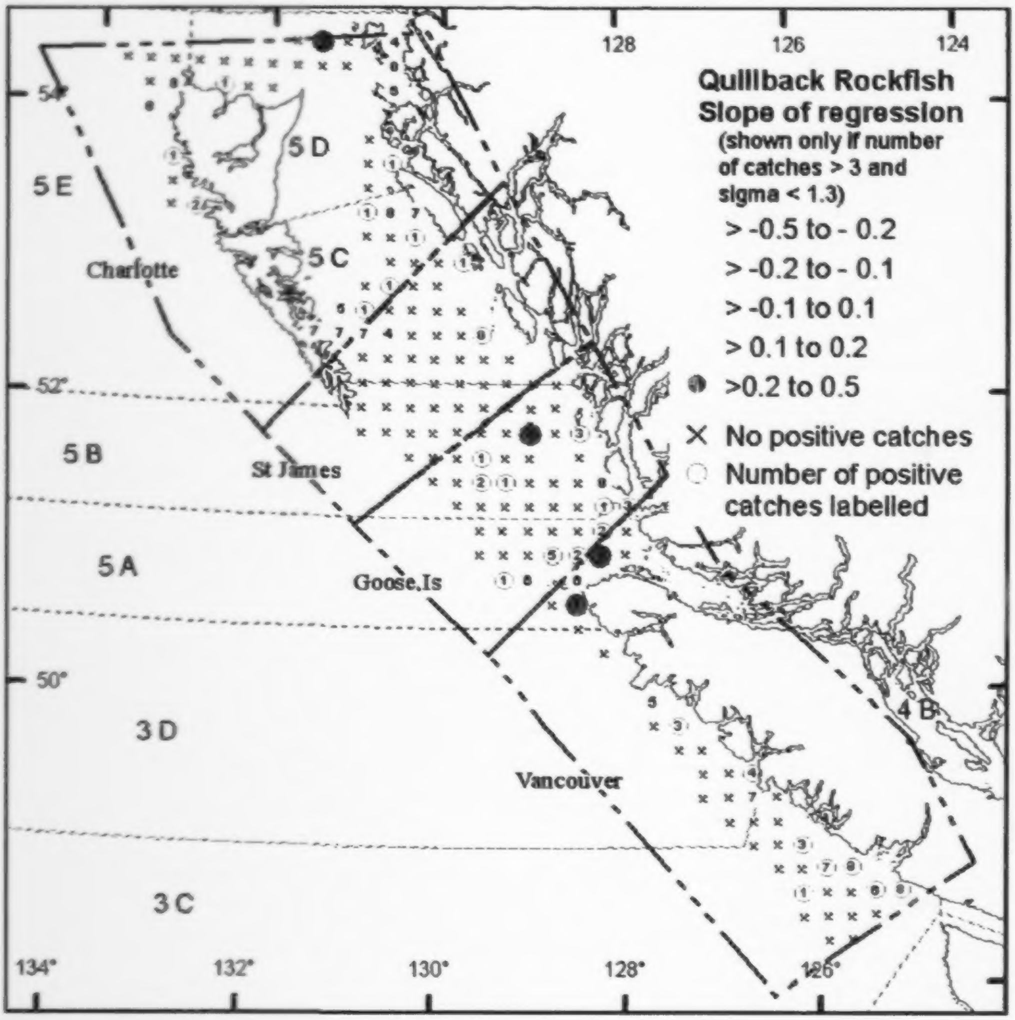
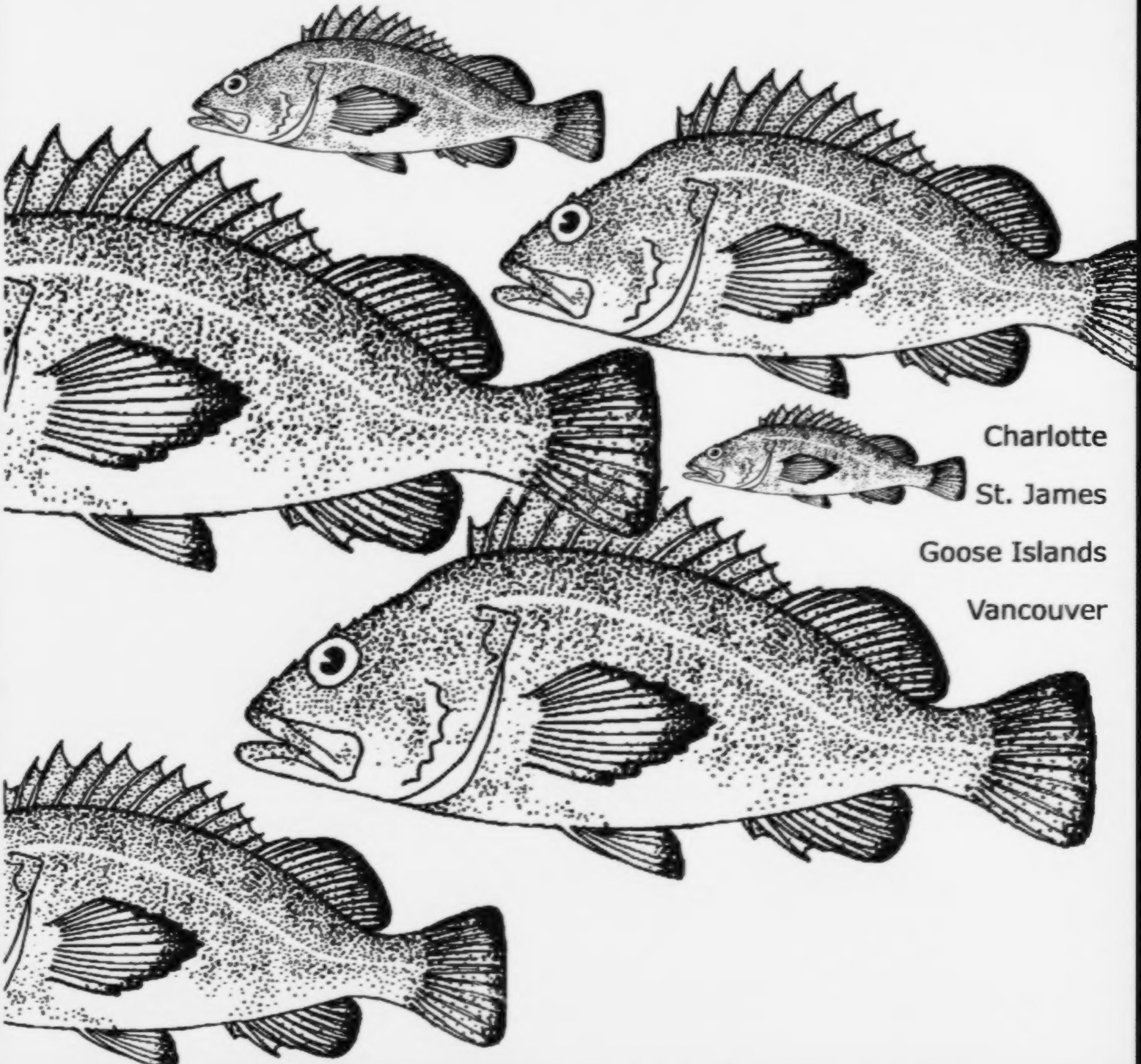

128
126
124
Quillback Rockfish
Slope of regression
(shown only if number of catches > 3 and sigma < 1.3)
> -0.5 to - 0.2
> -0.2 to - 0.1
> -0.1 to 0.1
> 0.1 to 0.2
>0.2 to 0.5
× No positive catches
Number of positive catches labelled
5 D
5 E
5 C
Charlotte
52°
5 B
St James
5 A
Goose.Is
50°
3 D
4 B
Vancouver
3 C
134°
132°
130°
128°
126°

Figure 18. Quillback Rockfish catch rate trends by station from 2003 to 2010, using data from all skates fished. For all stations the number of positive catches over the time series is labelled. The classified slope of the regression on non-zero catch rates is shown for stations with more than 3 positive catches and for which the residual standard error of the regression (σ) is less than 1.3.

Left Blank on Purpose

Appendix A. 2010 IPHC Survey Sampling Protocol
2010 Area 2B and SE Alaska bycatch sampling manual.pdf

2010 PROTOCOLS FOR ROCKFISH DATA COLLECTION IN BRITISH COLUMBIA



Charlotte

St. James

Goose Islands

Vancouver

CONTENTS

INTRODUCTION 1
- Changes from 2009 1

HOOK BY HOOK OCCUPANCY DATA COLLECTION 2
- Overview 2
- Hook Tally Form 2
- Procedure 3
- Form Example: 6

ROCKFISH BIOLOGICAL DATA COLLECTION 7
- Overview 7
- Set Form C 7
- Procedure 7
- Boom or Bust 10
- Unidentified rockfish and unknown maturities 12

OTOLITH COLLECTION SPECIFICS 13
- Otolith Tray Label 14
- Mailing Otoliths 14

CONVERSION FACTOR DATA COLLECTION 16
- Background 16
- Data form 17
- CF Data submission 18

MISCELLANY 19
- 20 hook count 19
- Data editing 19
- Lost hook tally form 19
- End of Trip Summary in your logbook 19
- Mailing data forms 19
- Evaluations 19
- Vessel Logbooks 19

APPENDIX 1: HOOK TALLY CODES 20

APPENDIX 2: PREDICTED ROCKFISH ENCOUNTERS FOR 2010 23

APPENDIX 3: IPHC STATIONS BY DFO AREA 27

APPENDIX 4: RANDOM NUMBER TABLE 31

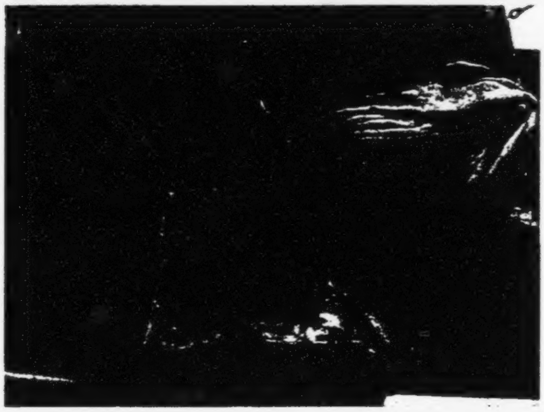
INTRODUCTION

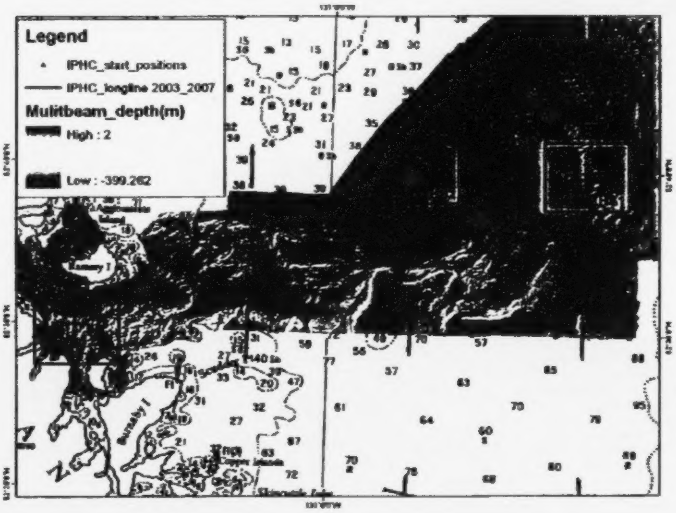
In 2010 the IPHC continues its collaboration with the Department of Oceans and Fisheries, Canada (DFO) to collect data about incidentally captured rockfish encountered during the Standardized Stock Assessment survey (SSA). Data will be collected from all charter regions in British Columbia.

Samplers will collect two distinct data sets: a whole-haul hook occupancy accounting and a suite of biological data from rockfish. A third IPHC sea sampler on these vessel will assist with data collection. One sampler will be focussed on collecting hook occupancy data, while the other two samplers will collect standard halibut survey data as well as sample rockfish as halibut sampling workload permits. Protocols have been developed so that rockfish can be sampled during the haul.

Changes from 2009

In 2010, DFO will again provide a Marel motion-compensated scale to collect round weights for a subsample of each species. These scales were effective in 2009, however, the scale on the Proud Venture was brand new and had not been prepared for field sampling and was therefore finicky. Because in 2010 more gear will be hauled at each station, a reduced sampling protocol is available for times when rockfish sampling begins to impact halibut sampling. If the lead sampler considers it helpful, samplers will also collect a both round and dressed lengths on a subsample of some species to establish a round to dressed conversion factor (CF) needed for one (optional) method of reduced sampling protocol. In 2008, no sets were subjected to reduced sampling; in 2009, one boat had to reduce sampling effort less than half a dozen times and the other vessel sampled all sets fully. Regardless of how well you streamline and coordinate rockfish sampling with the crew, we feel it is important for data quality as well as team morale to have reduced sampling effort protocols available in case you really need to use them.





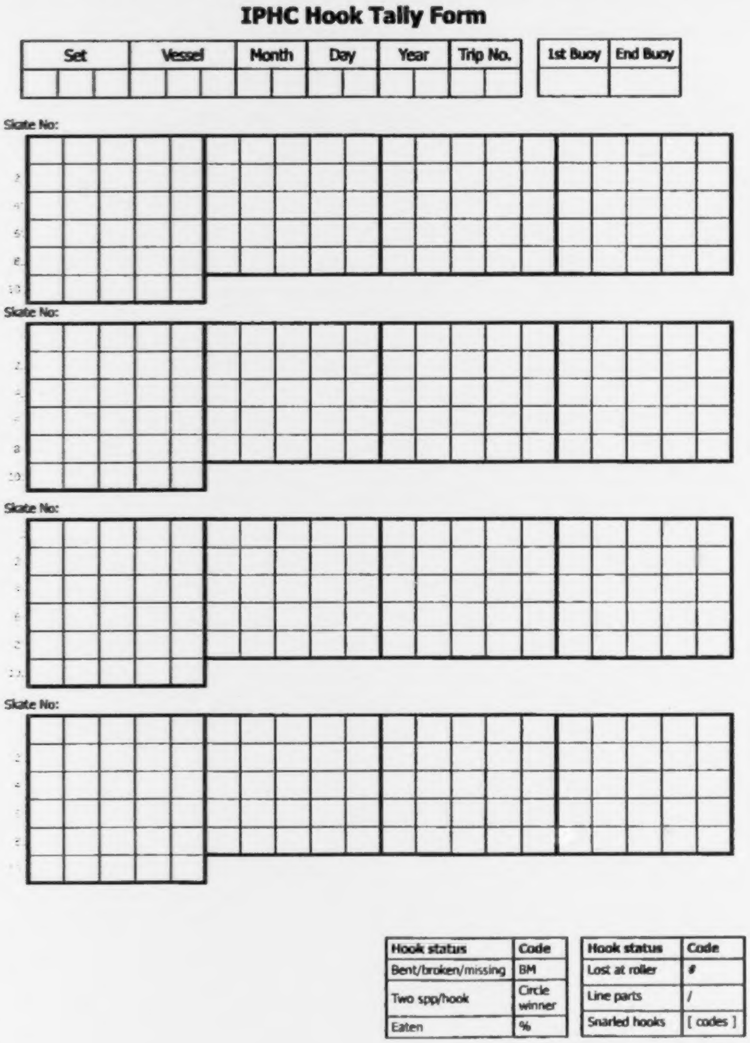
HOOK BY HOOK OCCUPANCY DATA COLLECTION

Overview

The IPHC collected hook-by-hook occupancy data on the SSA survey from 1993-1996 for internal research projects. Several individual projects in later years also collected these data. The goal of hook-by-hook sampling (a.k.a. whole-haul hook tally) is to record the species caught in order along the line. DFO overlays these data on high resolution bathymetric features for fine-scale habitat analysis.

Hook Tally Form

Each tally form represents one IPHC set. Each form has eight blocks of squares. Each block of 105 squares represents one skate of gear and each square represents one hook. If the gear is maintained to survey standards, there will never be more than 105 hooks per skate. Never record information about two different skates of gear within one block of squares. Use the space on the bottom of the page to tally rockfish that were counted but will not be part of Set Form C data (e.g., lost at the roller, sand fleaed, etc). Explain any discrepancy between counts on hook tally form and on Set Form C in the logbook and on the data form.



IPHC Hook Tally Form

Set	Vessel	Month	Day	Year	Trip No.	1st Buoy	End Buoy

Skate No:

Skate No:

Skate No:

Skate No:

Hook status	Code
Bent/broken/missing	BM
Two spp/hook	Circle winner
Eaten	%

Hook status	Code
Lost at roller	#
Line parts	/
Snarled hooks	[codes]

Procedure

HEADER

Transcribe set number, vessel code, date, trip number and buoy information from the Set Form A.

SKATE NO.

Observe retrieval of the first flag and buoy. Label the top block of squares on the Hook Tally Form with the appropriate skate number depending on which direction the set is being hauled. When the gear is hauled backwards, still begin the hook tally at the top block of squares, but use the skate number of the last skate set. Always begin at the top of the form, regardless of the hauling direction.

HOOK OCCUPANCY

Find a safe location with a view of the line coming out of the water where you can also see the rollerman's work area. It is important to have a clear view of the hooks as they come out of the water.

Record the status or occupancy of each hook, begin at the top left square of the block and continue across to the end of the row, then move to the left square on the second line and work across that row, and so on.

Identify and record all vertebrates to the species level. Do your best to identify all invertebrates to the species level. Ask the deck sampler to confirm identification.

Use the standard set of shorthand Hook Tally Codes supplied in Appendix 1. Please use an upper case letter for each code, except for 'E', which may be written lower case. Legibility is paramount! If there is not a shorthand code assigned to a species, write the numeric IPHC species code for the organism in the square. A detailed list of IPHC species codes is found in the 2010 SSA survey manual. An example of the top 10 hook tally codes used for animals in BC in 2009 is shown below.

Common Name	Hook Tally Code
Spiny Dogfish	D
Pacific Halibut	H
Sablefish (Black cod)	BC
Arrowtooth Flounder	A
Yelloweye Rockfish	YE
Redbanded Rockfish	RB
Sunflower Sea Star	SN
Longnose Skate	LN
Lingcod	LC
Rougheye Rockfish	RE

FREQUENTLY USED HOOK TALLY CODES

When there is a skate change, begin recording hook occupancy in a new block of squares for the new skate. If there were less than 105 hooks on the skate, leave the remaining squares empty. Remember, hooks from different skates should never be recorded in adjacent squares.

Inanimate Objects

If the hook 'catches' or snags an inanimate object (e.g., rocks, shoes, derelict fishing gear), fill in the square for that hook with the inanimate object code (IPHC species code 100).

Unidentified Plant Matter

If the hook 'catches' or snags sticks or logs, fill in the square for that hook with the unidentified plant matter code (IPHC species code 296).

Algae

Ignore the presence algae snagged by the hook or the line and record the appropriate status.

HOOK STATUS

When a hook has not caught an object, has caught more than one organism, or the organism has been bitten or lost at the roller, record a code describing the state of the hook. Use the codes listed in the table below.

Hook status	Hook Tally Code
Empty Hook	E
Bait	B
Skin Hook	S
Bent/Broken/Missing	BM
Two spp/hook	depredator predator
Eaten	code %
Lost at roller	code #
Line Parts	/
Snarl- write brackets around the hooks involved in the snarl	[ ]

* For the Empty Hook code, you may use a lower case, hand-written "e", as long as the letter is written clearly.

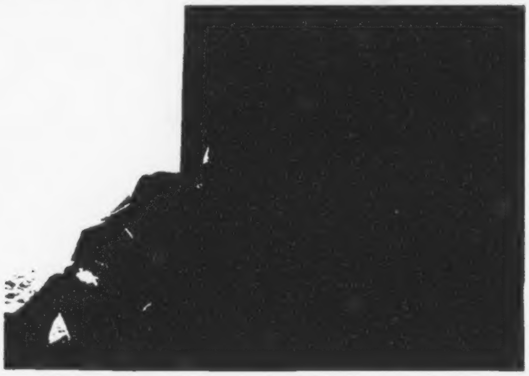
DIFFERENCE BETWEEN 'BAIT' AND 'SKIN HOOK'

Use Hook Tally Code 'B' (Bait) when the retrieved hook contains the original bait, including the skin and all or part of the flesh. Use the Hook Tally Code 'S' (Skin) when the retrieved hook contains only the skin of the original bait, or there is hardly any of flesh left on the bait skin.

UNIDENTIFIED CODES

If you are not 100% confident you can correctly identify a discarded organism to the species level, ask the rollerman to bring it on board. Only unidentifiable escaped organisms should be recorded using an 'unidentified' code.

Code thornyheads on the line as "UI, Unidentified Idiot (Thornyhead)" whenever you do not have the fish in hand to identify it to the species level.



META-CODES

The following codes are used to describe either the condition of the line or additional information about the status of the hook.

Gear snarl: []

Gear snarls are commonplace during longline operations. Gear snarls make it difficult to accurately record the sequential order of hooks and catch. Make your best guess as to the sequence of the hooks (and status) in the snarl and record hook status in the boxes on the form. Then put brackets (**[ ]**) around the hooks involved in the snarl. The purpose of the brackets is to inform data users of the hook status with the caution that the order is uncertain. If only two or three hooks are involved in the 'snarl' you should be able to determine the status of each hook and brackets should not be needed.

Parted gear: /

When the longline parts the vessel will run to the other end and retrieve the gear. When the groundline parts record a forward slash (**/**) after the last retrieved hook. When hauling resumes from the other end, begin recording hook status in reverse order starting with the last square in the last block of squares. Record hook status in reverse order from right to left for the entire row. After the row is filled, move to the next row above and continue in the same manner. At the skate junction, move to the next block of squares directly above, starting from the bottom square in that block.

In short, you will be filling the squares with hook information in the opposite direction from the way you were filling the squares before the gear parted so that the total sequence of hooks on the page will still match the sequence of hooks on the line. When the last hook is comes aboard, place another slash to the left of the last retrieved hook. There should be forward slashes at both ends of the parted gear. Record the details of the parted gear in the logbook.

If the line parts before any hooks have been retrieved, complete the hook tally form as if nothing happened and make a note of the event in the logbook. However, be sure the skates are numbered correctly on the form.

Two species caught on one hook: circled

When two fish are caught on one hook, the first fish hooked is considered the predator, because it was pursuing the bait. The second fish is considered the depredator, because it was attacking the predator. The depredator is the species of interest. On the hook tally form, record the depredator first. Circle this code to note its importance and then record the code for the predator to the right of the circled depredator code. (e.g LC RE)

Eaten fish: %

Write a percent (**%**) sign next to the code for the animal if the fish shows fresh bite wounds, heavy sand flea predation, or if only lips or a head come up on the line.

Lost at the roller:

Write a pound (**#**) sign next to the code when a fish that would normally be retained is lost at the roller. In 2009, only rockfish, pacific cod, and halibut will be retained during survey, so only these species can be considered "lost at roller".

PROTOCOLS FOR ANOMALOUS EVENTS:

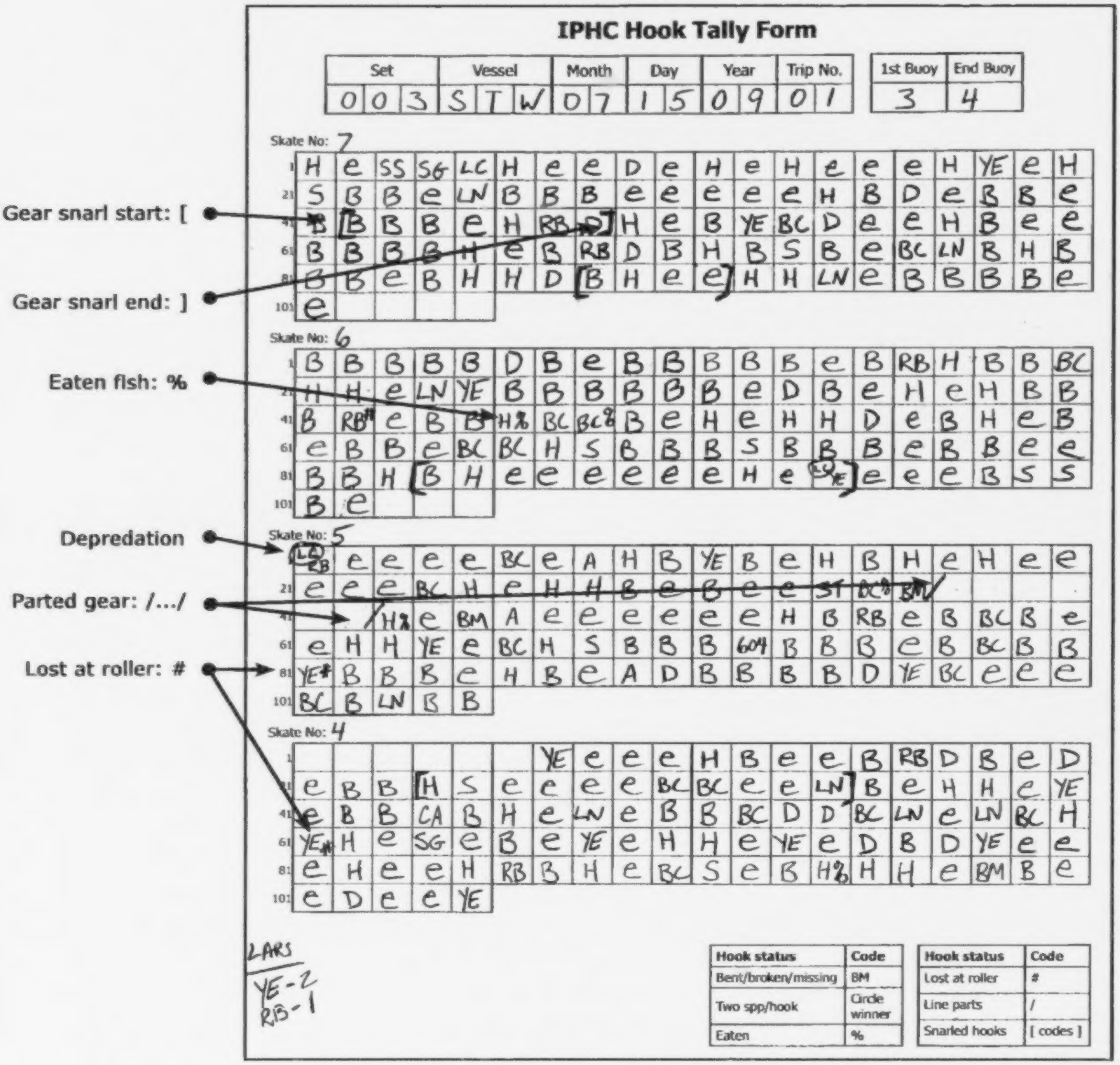
A skate has >105 hooks

If a skate has more than 105 hooks record occupancy of **all** hooks by adding additional squares to that skate's block. Be sure to flag the skate for correction by the crew.

Lost gear

If gear is lost during a haul estimate the number of hooks lost on each skate based on the number of hooks set and fill in the appropriate number of boxes with code '306' or 'UN'. If all skates are lost write "ALL GEAR LOST" across the Hook Tally Form for that set.

Form Example:



Gear snarl start: [

Gear snarl end:]

Eaten fish: %

Depredation

Parted gear: /…/

Lost at roller: #

IPHC Hook Tally Form

Set			Vessel			Month		Day		Year		Trip No.		1st Buoy	End Buoy
0	0	3	S	T	W	0	7	1	5	0	9	0	1	3	4

Skate No: 7

1	H	e	SS	SG	LC	H	e	e	D	e	H	e	H	e	e	e	H	YE	e	H
21	S	B	B	e	LN	B	B	B	e	e	e	e	e	H	B	D	e	B	B	e
41	B	[B	B	B	e	H	RB	D]	H	e	B	YE	BC	D	e	e	H	B	e	e
61	B	B	B	B	H	e	B	RB	D	B	H	B	S	B	e	BC	LN	B	H	B
81	B	B	e	B	H	H	D	[B	H	e	e]	H	H	LN	e	B	B	B	B	e
101	e																			

Skate No: 6

1	B	B	B	B	B	D	B	e	B	B	B	B	B	e	B	RB	H	B	B	BC
21	H	H	e	LN	YE	B	B	B	B	B	B	e	D	B	e	H	e	H	B	B
41	B	RB#	e	B	B	H%	BC	BC%	B	e	H	e	H	H	D	e	B	H	e	B
61	e	B	B	e	BC	BC	H	S	B	B	B	S	B	B	B	e	B	B	e	e
81	B	B	H	[B	H	e	e	e	e	e	e	H	e	LS YE]	e	e	e	B	S	S
101	B	e																		

Skate No: 5

1	LA RB	e	e	e	e	BC	e	A	H	B	YE	B	e	H	B	H	e	H	e	e
21	e	e	e	BC	H	e	H	H	B	e	B	e	e	ST	BC%	BM/				
41		/	H%	e	BM	A	e	e	e	e	e	e	H	B	RB	e	B	BC	B	e
61	e	H	H	YE	e	BC	H	S	B	B	B	604	B	B	B	e	B	BC	B	B
81	YE#	B	B	B	e	H	B	e	A	D	B	B	B	B	D	YE	BC	e	e	e
101	BC	B	LN	B	B															

Skate No: 4

1							YE	e	e	e	H	B	e	e	B	RB	D	B	e	D
21	e	B	B	[H	S	e	e	e	e	BC	BC	e	e	LN]	B	e	H	H	e	YE
41	e	B	B	CA	B	H	e	LN	e	B	B	BC	D	D	BC	LN	e	LN	BC	H
61	YE#	H	e	SG	e	B	e	YE	e	H	H	e	YE	e	D	B	D	YE	e	e
81	e	H	e	e	H	RB	B	H	e	BC	S	e	B	H%	H	H	e	BM	B	e
101	e	D	e	e	YE															

LARS
YE-2
RB-1

Hook status	Code
Bent/broken/missing	BM
Two spp/hook	Circle winner
Eaten	%

Hook status	Code
Lost at roller	#
Line parts	/
Snarled hooks	[codes]

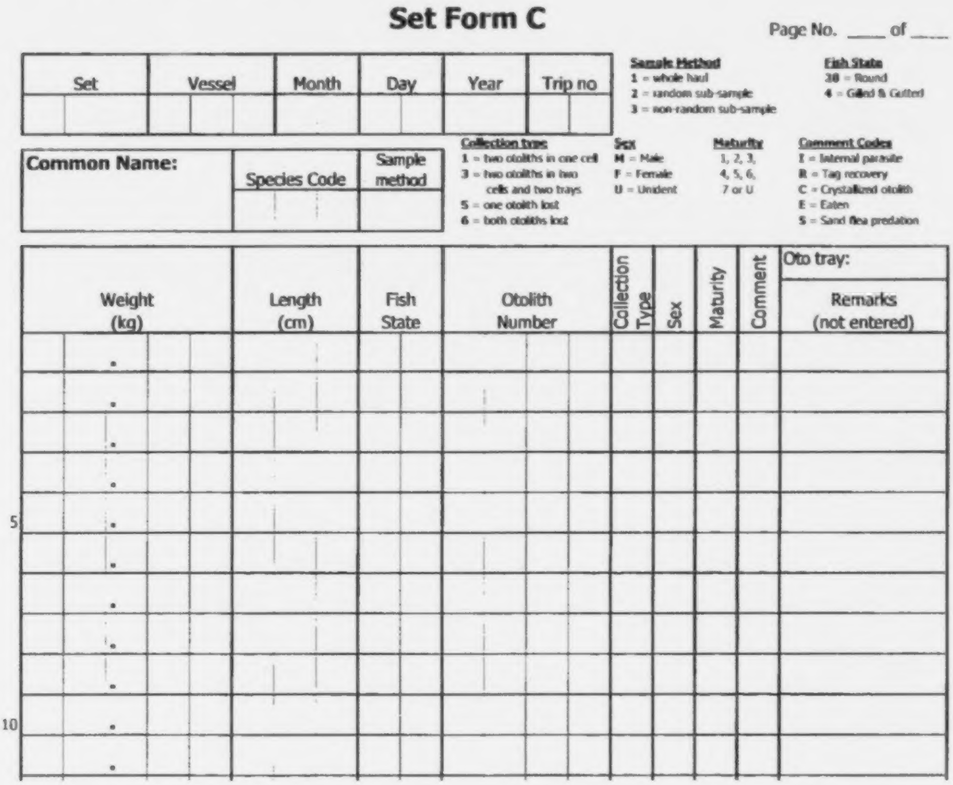
ROCKFISH BIOLOGICAL DATA COLLECTION

Overview

The Set Form C is for recording biological data from non-target species encountered on our surveys. These data include weight, length, sex, maturity, and otolith collection information; and are referred to as LSMO data in this document. The Set Form C is similar to the Set Form B, used for recording biological data from halibut. As with halibut sampling, the shack sampler will record rockfish data on the forms and put the otoliths in the trays. The third sampler will be occupied recording hook occupancy throughout haul, so will not be available to collect biological data from rockfish until hauling is completed. The deck sampler's priority is halibut sampling. If halibut catch allows, the deck sampler should collect rockfish data throughout the set. The appendix has tables showing predicted rockfish and halibut catch at each station; use this information to anticipate your workload for the set and plan accordingly.

Set Form C

Set Form Cs are double-sided. Use the Set Form C to record data about one species on the front side and the same or a different species on the back side. Do not record data from more than one set on one Set Form C. Fill out all header information, even if data on both sides of the paper are from the same species.



Set Form C

Page No. ____ of ____

Set	Vessel	Month	Day	Year	Trip no

Sample Method
1 = whole haul
2 = random sub-sample
3 = non-random sub-sample

Fish State
38 = Round
4 = Gilled & Gutted

Common Name:	Species Code	Sample method

Collection type
1 = two otoliths in one cell
3 = two otoliths in two cells and two trays
5 = one otolith lost
6 = both otoliths lost

Sex
M = Male
F = Female
U = Unident

Maturity
1, 2, 3, 4, 5, 6, 7 or U

Comment Codes
I = Internal parasite
R = Tag recovery
C = Crystallized otolith
E = Eaten
S = Sand flea predation

Weight (kg)	Length (cm)	Fish State	Otolith Number	Collection Type	Sex	Maturity	Comment	Oto tray: Remarks (not entered)
.								
.								
.								
.								
.								
.								
.								
.								
.								
.								
.								

Procedure

Rockfish will be collected and processed throughout the set. They do not have to be separated according to skate. Do not collect LSMO data from *Sebastolobus* species (thornyheads). Fish will be weighed and measured in the round state, then dressed by the crew and returned to samplers for collection of LSMO. Spring clamps with numbered disks will be attached to fish after weighing in order to track fish from round to dressed state.

HEADER

Transcribe the set number, vessel code, date, and trip number from the Set Form A.

COMMON NAME

Write the common name of the sampled species.

SPECIES CODE

Record the numeric IPHC species code of the sampled species.

SAMPLE METHOD

Sample method describes the sampling system. There are three possible codes:

1 = whole haul: all retained fish of this species were sampled.

2 = random sub-sample: a random collection from the retained fish of this species was sampled.

3 = non-random sub-sample: a portion of the retained fish were selected non-randomly for sampling.

The Sample Method will be '1' (whole haul) for all species, except when you have to enact the reduced sampling protocols. When using the reduced-sampling protocol, the specimens with LSMO data are Sample Method code 3, while the remaining specimens (those subjected to the reduced sampling protocol) must be on data sheets with Sample Method code 1. **Note: Specimens with different Sample Methods may not be recorded on the same Set Form c.**

WEIGHT

Using the motion-compensated scale, record the weight of the fish to the nearest gram (or possibly lower resolution if dictated by scale and conditions). The fish should be weighed round, not gilled or gutted unless it is one of the species for which you have been collecting CF data (yelloweye, redbanded, quillback, silvergrey, and rougheye), in which case you may already have recorded the round weight on the CF form. The weight and length for each fish on this form must be recorded from the same fish state (either both round or both dressed). Follow the protocols for scale usage as directed by the DFO representative who brought the scale to your boat. To track a fish from the round to dressed state, attach a numbered spring clamp to the fish after weighing and convey number to the shack sampler.

LENGTH

Using the halibut cradle to measure the fish in the round state, record the fork length in centimeters in the same way halibut are measured. If the caudal fin is not forked, measure to the center of the caudal fin. Except for the four or five species for which you may collect round to dressed CF data, always measure these fish in the round, not gilled or gutted. The weight and length for each fish on this form must be recorded from the same fish state (either both round or both dressed). To track a fish from the round to dressed state, attach a numbered spring clamp to the fish after weighing and convey number to the shack sampler.

FISH STATE

Record the physical state of the fish at time you took the length and weight measurements. Most fish will be measured round. If you have measured a fish that does not fit into either of the following codes, note this in the remarks field, and let the office know that you need a code for the new fish state—but avoid this situation if possible.

4 = dressed, gills and guts removed, gonads intact

20 = round, gills and belly intact.

OTOLITH NUMBER

Record the number of the otolith. On each vessel, otoliths from each species will be numbered sequentially throughout the season beginning at number one for each species. Refer to the following section titled Otolith Collection for otolith extraction instructions.

Every LSMO sampled fish will have an otolith number, even if both otoliths are lost. If both otoliths are lost, leave the oto tray cell empty for that fish, and record the number of the empty oto tray cell on the Set Form C as the otolith number. Every fish on the Set Form C has a corresponding cell in the oto tray, regardless of the type of otolith collection made (**except** when the reduced sampling protocol is enacted, in which case, the fish that are measured only will not have an otolith number, but will be recorded on the Set Form C).

COLLECTION TYPE

Collection type describes the type of specimen collected during sampling. There are four valid otolith collection codes. More details are in the Otolith Collection section.

1 = both otoliths collected and stored in one cell in the otolith tray
3 = both otoliths collected and stored in separate cells because two cannot fit in one cell. The first otolith will go in cell 'N in tray A and the second otolith will go in cell 'N' in tray B. For example: the first otolith goes in cell 44 in Tray 3 and the second otolith goes in cell 44 in Tray 4.
5 = one otolith lost; one otolith collected and stored in the otolith tray
6 = both otoliths lost

SEX

Record the sex of the fish. There are three acceptable codes:

M = Male
F = Female
U = Unidentified. Use the unidentified code if you are unable to classify the sex, or were unable to observe the gonads for whatever reason.

MATURITY

Consult the rockfish maturity guidelines outlined below and, to the best of your ability, assign a maturity to the sample. If you are unable to determine the maturity, or did not observe the gonads, use code U.

		Female		**Male**	
Maturity Code	*Maturity stage*	*Maturity sub-stage*	*Gonad Condition*	*Maturity sub-stage*	*Gonad Condition*
1	Immature	Immature	small translucent pink	Immature	threadlike translucent pink
2		Maturing	**small** yellow eggs no small black dots present (no reabsorbed larvae) translucent or opaque	Maturing	**string-like** slight swelling residual milt not present translucent
3	Mature	Developed eggs	**large** yellow or orange eggs a few small black dots may be present (reabsorbed larvae) **opaque**	Developing	**swelling** residual milt may be present in seminal vesicle brown-white
4		Fertilized eggs	**large** orange-yellow eggs **translucent**	Developed	**large** **easily broken** **white**
5		Embryos/larvae	large Embryos or larvae present- include **eyed eggs** translucent	Running	**running** sperm
6		Spent	large **flaccid** a few larvae may be present red ovaries	Spent	**sperm still in duct** white-brown
7		Resting	moderate size **firm** **orange-grey ovaries, some with dark blotches**	Resting	**small** **triangular in cross-section** **brown**
U	Unknown	Unknown	Unknown	Unknown	Unknown

Remember the following points while determining rockfish maturities:

- Mature rockfish cycle back to maturity stage **#3**, after the resting stage **#7**, for example: 1-2-3-4-5-6-**7-3**-4...
- For females – look for the presence of eyed larvae (small black dots on ovaries) to distinguish mature females (stage 3) from maturing females (stage 2) which do not have eyed larvae present. Determining mature from immature is most important.
- For males – look for the presence of residual milt in the seminal vesicle to distinguish mature testes (stage 3) from immature testes (stage 2), which will not have residual milt present.

COMMENT

There are five comment codes that may be entered in this column. You can only enter one code in the comment code field. If you encounter a fish that has more than one comment code, see the priority rules below. You may enter additional comment codes in the Remarks section.

I = Internal parasite present. Use this code to indicate that you observed evidence of parasitic copepods- *Sarcotaces spp.*- in the gut cavity. According to *The Rockfishes of the Northeast Pacific* by Love, Yoklavich and Thorsteinson, adult *Sarcotaces* live in an internal cyst that is usually attached to the rectum, where it feeds off the blood of the host. The cyst often appears as a silver sac filled with black ink that, when burst, emits a black fluid.

R = Tag recovery. If you find a tagged rockfish collect the data required for the Set Form C, record the tag number in the remarks field, and put the tag in a completed tag envelope.

C = Crystallized otolith(s).

E = Eaten or bitten by dogfish, shark, whale, etc. Ignore healed bite wounds.

S = Eaten by sand fleas.

OTO TRAY

This field was requested by samplers to track the trays they were using. It is not entered into the database, so you can use it as you please.

REMARKS

Write the fish tracking number (spring clamp number) here to track the specimen from round to dressed state. Place any other information you find useful in this field, keeping in mind that it is not entered in the database, so end-users of this data will not see your comment unless they have the data sheet in hand.

TOTAL NO. SAMPLED FOR SET FORM C AND TOTAL NO. OBSERVED ON THE HOOK TALLY FORM

Record the total number of fish of that species sampled on the Set Form C for that set. Record the number of times that species was recorded on the Hook Tally Form. Do this once for each species on every set. The number observed on the Hook Tally Form should equal the number sampled on the Set Form C, after fish that were lost at the roller have been added. If there are irresolvable differences between the counts record the explanation in the logbook.

Boom or Bust

NO ROCKFISH CAUGHT

If no rockfish are captured on this set, it is not necessary to fill out a Set Form C. Please make sure to write "No Rockfish caught" in the Comments section of the Set Form A for that set.

TOO MANY ROCKFISH TO HANDLE

There may be times when you will not be able to complete all the required rockfish sampling before it is time to haul the next string. If this situation is encountered, the fish should be placed in baskets or buckets and stored out of the way in a cool place, (and separate from fish on the next string) until there is sufficient time to complete the sampling. You may need to store the fish in the hold to maintain quality and food safety. Use the time at the end of the day to complete the sampling.

If sampling rockfish begins to negatively affect halibut sampling, halibut sampling takes priority. When the rockfish capture is too high for all specimens to be processed or when unforeseen events prevent you from collecting full LSMO data from all rockfish, you will have to reduce sampling on rockfish. To that end we have worked with DFO to arrive at a reduced sampling protocol that still provides DFO with useful data. We consider this an 'emergency escape button' of sorts, and we do not expect it to be employed more than a couple of times in each charter region—if that often. If you find yourself using the reduced sampling protocols more than two times on a trip, please call the office and discuss the deck situation so we can convey this to DFO at the end of the year.

Reduced Sampling Protocol

Based on the workflow and other issues, the lead will to select from from the following three options:

1. Collect round length and sex (no weight) on Set Form C
2. Collect round length and round weight on Set Form C
3. Collect dressed length and weight; requires that sufficient conversion factor data is collected.

Before enacting reduced sampling protocol, you must first sample 50 fish for standard data collection of LSMO (and CF data if needed). If there are 50 yelloweye rockfish, sample the yelloweye first. If there are less than 50 yelloweye, sample all available yelloweye first, then make up the remaining sample from redbanded, then quillback, then copper, china, tiger, and black rockfish.

Priority	Species
1	Yelloweye
2	Redbanded
3	Quillback
4	Copper
5	China
6	Tiger
7	Black

After you have collected LSMO for at least 50 fish, sample the remaining rockfish by collecting only the length and weight.

Sample Method: Do not mix sample methods on one sheet! On the data sheets with records of the 50 LSMO fish, record the Sample Method 'code 3 = non-random subsample'. On the sheets containing reduced data collection (length + weight or sex), record Sample Method 'code 1 = random sample' because you will be sampling every fish for length and weight (or sex).

When collecting only lengths and weights (or sex) from a sampled fish, complete all fields as usual, leaving Collection Type, Sex (or Weight), and Maturity, and Otolith number blank. If you need to begin a fresh page, continue to use Sample Method of '1' for this species.

This reduced-effort sampling protocol is intended to allow you to begin sampling while gear is still being hauled. If you have all pieces for one species on deck at the end of the haul, use the random sample table to select fish for sampling—do not simply select the first 50 fish in this case—and remember to use Sample Method of '2'. A random sample table is in the appendix.

Unidentified rockfish and unknown maturities

If you are unable to confidently identify a rockfish or have problems classifying the maturity level of a sampled fish, please utilize the resources listed below to ensure the correct ID and maturities are assigned.

1. CALL OR EMAIL A DFO REPRESENTATIVE FOR ADVICE

Lynne Yamanaka is the lead scientist on this project and the end-user of the data you are collecting. Telephone her from the vessel to discuss any problems you have with identifications or maturities. Please take good notes of your conversation so you can relay what you learn to the IPHC office.

If you are unable to contact Lynne, call the DFO port samplers from Vancouver and Prince Rupert for assistance.

DFO contacts

Lynne Yamanaka (Project director)	office: 250-756-7211 cell: 250-714-9251 email: Lynne.Yamanaka@dfo-mpo.gc.ca
Schon Acheson (Vancouver)	office: 604-666-2658 cell: 604-209-4184 email: AchesonSm@pac.dfo-mpo.gc.ca
Kristina Anderson (Prince Rupert)	office: 250-627-3475 email: AndersonKr@pac.dfo-mpo.gc.ca

2. SAVE THE SPECIMEN FOR LATER ANALYSIS

Label a freezer bag for the sample with the following information: "IPHC research", vessel name, date, set number, your name, otolith number, and the species name or maturity code you have assigned the fish on the data sheet.

Record all label information in the logbook and outline the difficulties of the identification.

Freeze the sample and pass it to a port sampler as outlined in the next point.

3. DISCUSS THE IDENTIFICATION WITH THE DFO OR AMR PORT SAMPLER AT LANDING

If you are offloading in Prince Rupert of Vancouver, call the DFO port sampler to arrange a meeting with them at offload. At the dock you can discuss the species ID or rockfish maturity with them, and give them the frozen sample so they can pass it on to the DFO office for further examination if necessary.

In Prince Rupert, you should only give the specimen to the AMR port sampler if the DFO sampler is unavailable. If you are offloading at other BC ports, you can ask the AMR port sampler for advice and give the frozen fish to them to store for DFO. Also inform the appropriate DFO representative as to whom was given the specimen.

Double-check that the specimen is well-labeled before handing it off to the port sampler. Record the name of the port sampler and any other details of the discussion in the logbook offload summary notes for that delivery.

OTOLITH COLLECTION SPECIFICS

COLLECTION

Collect both otoliths from each fish, and place them together in one cell in the otolith tray. Make cuts for otolith extraction from within the gill cavity to avoid damaging the outside of the fish. Cuts to the outside of the head can reduce marketability of the catch.

CLEANING AND STORAGE

Rockfish otoliths do not need to be kept in glycerin, but must be stored **clean and dry**. Make sure to remove all blood and membranes from the otoliths and wipe them dry with a towel before storing them in the tray. Take time at the end of the day or while the vessel is setting the following morning to ensure the otoliths are completely clean.

CRYSTALLIZED OTOLITHS

Collect crystallized otoliths and process them in the same manner as un-crystallized otoliths. Record 'C' in the Comment field.

BROKEN OTOLITHS

Save and collect the pieces of broken otoliths.

TRAY NUMBERING

Otoliths will be stored in separate trays for each species. Record the tray number on the otolith label affixed to the lid as Tray # __ of __.

CELL NUMBERING

Otolith trays contain one hundred cells that are numbered by the IPHC from 1 to 100 and from left to right and top to bottom. The plastic molding on the tray shows a different numbering system, but your tray bien holder is numbered with the IPHC system for reference.

Cells will be filled sequentially throughout the season on each vessel, starting at 1 for each species, and vessel. The cell number on the otolith tray will always correspond to the otolith number recorded on the Set Form C. Throughout the set, double check that you have the same number of otoliths in the tray as you have on the Set Form C, and that any fish with Collection type of 6 are represented in the tray by an empty cell.

Do not skip cells between sets or trips: always start the next set and the next trip in the next available cell. Place a **paper star** in the first and last cell of each tray and at the beginning and end cells of each trip. Mark the paper star with the vessel code, trip number, Hook Tally species code and otolith number.

LOST OTOLITHS

If you lose **one otolith**, collect the remaining otolith and **record code 5** (one otolith lost) in the Collection Type field. The single otolith will occupy the cell that corresponds to the otolith number.

If you lose **both otoliths** collect the remaining data from the fish, record the otolith number, **record code 6** (both otoliths lost) in the Collection Type field, and leave the corresponding otolith cell empty. For the next fish ensure the otolith number matches the next cell in the otolith tray. Because trays will be filled sequentially and completely, the only empty cells in a tray will represent sampled fish with both otoliths lost.

LARGE OTOLITHS

If otoliths are too large to fit into the cell, you may snip the tips off the otoliths so they will fit in the cell. Avoid making a break near the center of the otolith. Try to avoid breaking otoliths if at all possible.

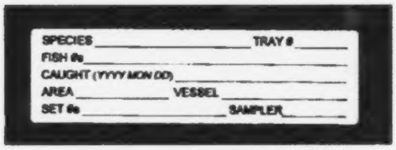
If the otoliths are still too large to fit in one cell, you will need to spread them across two cells and two trays. In order to maintain the link between otolith number and cell number you will put the second otolith in the same cell number in a **new tray.** For example, if the 44th sampled Rougheye rockfish has otoliths that are too big to fit into one cell store one otolith in cell 44 of the first otolith tray and the second otolith in cell 44 of the second otolith tray. This may seem like a 'waste' of tray space, but it is currently the best method to collect two large otoliths and maintain a numbering system that allows you to coordinate otolith number with cell number. In this instance record code 3 (two otoliths split in two cells and two trays) in the Collection Type field. For the next fish, use the next consecutive otolith number and store the otoliths in the next available cell **in the new tray**. Leave the remaining cells in the old tray empty. If tray supply is running low, you may place the second otolith in an envelope and follow labelling procedures in the paragraph below.

If a single otolith alone is too large to fit in a cell and you do not want to clip the ends off, put a star in that cell and put the otoliths in an envelope. Be sure to write vessel, year, species, and otolith number on the envelope. Attach the envelope to the appropriate Tray Bien with rubber bands or tape.

Otolith Tray Label

DFO has supplied the IPHC with Tray Biens™ for storing rockfish otoliths. These trays have special labels that should be completed as outlined below.

DFO Rockfish otolith tray label shown below



SPECIES ____________________ TRAY # ______
FISH #s ______________________________
CAUGHT (YYYY MON DD) __________________
AREA ____________ VESSEL ______________
SET #s ________________ SAMPLER ________

Species

Record the Latin name for the species.

Tray

Label the trays as 1 of 3, 2 of 3, and 3 of 3.

Fish Number

Record the range of otolith numbers in the tray.

Caught

Record the range of dates the otoliths were obtained, in the following format: YYYYmonDD (e.g. 2007Jun04 – 2007Jul17).

Area

List all DFO Areas in which these fish were caught (Appendix 3 lists the DFO area for each IPHC station).

Vessel

Record the full name of the vessel.

Set Numbers

Record the range of set numbers included in the tray.

Samplers

Record the full name of the lead sampler.

Mailing Otoliths

Mail otoliths to Seattle after the boat has completed all its BC charter regions for the season. If you do not have sufficient storage space on your vessel for the full trays you may mail

completed trays to Seattle as needed. If you accidentally mail a tray of otoliths with unused cells mid-season, start the next tray on the next cell number. Cell number should always match otolith number from Set Form C.

> For Example:
>
> Trip two has ended with yelloweye fish number 332. The cases have been mailed back to the lab, so trip three will start with a new case. The first yelloweye otolith number will be 333, and its otolith will be placed in cell 33.

Use rubber bands or masking tape to secure the lid of the tray, but be sure not to cover the label. Package rockfish otoliths separately from halibut otoliths. Clearly mark the outside of the package to indicate it contains rockfish otoliths.

CONVERSION FACTOR DATA COLLECTION

Background

Obtaining conversion factors (CF) for converting dressed lengths and weights to round lengths and weights will allow managers to use our data without taking round measurements of every fish. Because DFO recognizes that rockfish characteristics vary dependent on latitude and because different dressing techniques affect the dressed weight and length, DFO does not use standard conversion factors for the rockfish work for which we are collecting data. We will collect round weight and a round length for **10% by number of each rockfish species or 50 specimens, whichever is greater** for each charter region. The collection of these data must be roughly dispersed among stations and sizes; i.e., don't collect all on one trip or all from fish of similar sizes.

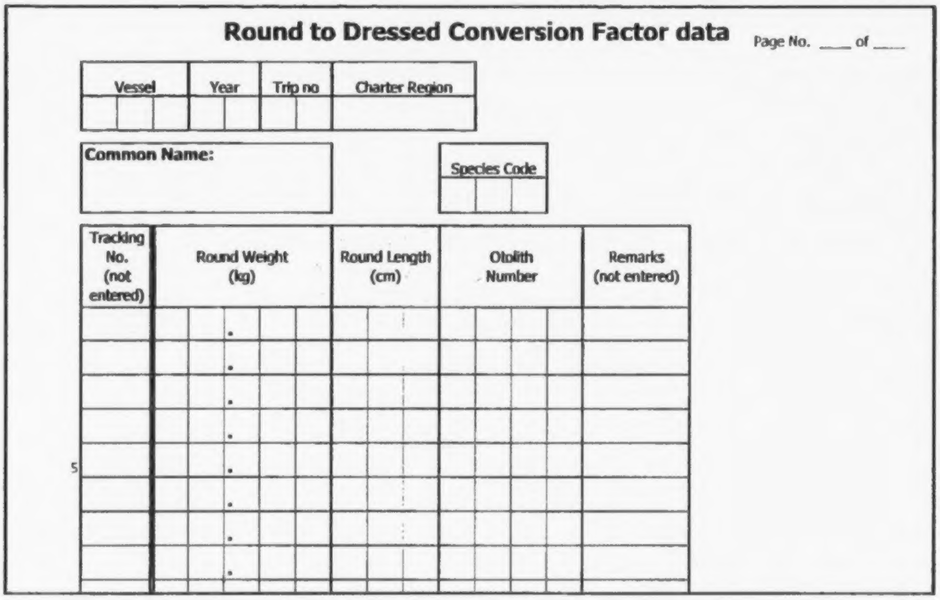
Charter region	Species potentially targeted for CF data collection
Vancouver	Quillback, Redbanded, Yelloweye
Goose Island	Redbanded, Yelloweye
St. James	Redbanded, Rougheye, Yelloweye
Charlotte	Quillback, Redbanded, Rougheye, Silvergrey, Yelloweye

While collecting the normal rockfish LSMO data, you will select fish for determining round to dressed conversion factors. These fish will not be selected randomly. Instead, select fish so that lengths are spread across the range of lengths for that species and so that the data collected is distributed (north-south) within that charter region. The appendix has tables showing maximum catch of each rockfish species at each station in 2B over the last two years and extrapolated to 8 skates. Use this information to predict when to take your CF samples on which species. You will notice that for several, less frequently encountered species, you will be collect CF data on every specimen because less than 50 fish are anticipated to be captured.

****Important consideration****

The lead will need to determine if collecting CF data will reduce or create work on your boat in the region you are working. If collecting round weights and lengths does not slow your workflow, it may be easiest to simply collect round weighs and lengths for all species rather than collecting dressed weights and lengths for all and round weights and lengths for only a subset. In 2009, leads decided that this method would not save time or work.

Data form



Round to Dressed Conversion Factor data Page No. ___ of ___

Vessel	Year	Trip no	Charter Region

Common Name:

Species Code

Tracking No. (not entered)	Round Weight (kg)	Round Length (cm)	Otolith Number	Remarks (not entered)
	.			
	.			
	.			
	.			
	.			
	.			
	.			
	.			

Record round lengths and weights on a conversion factor data collection sheet(s) for each species for which you have decided to collect CF data. The data on the CF form is linked to the Set form C by vessel, year, species, and otolith number. At the top of the form, add the vessel code, year, and charter region. Write the common name of the species recorded on the form and enter that species number as well. The data table has five (5) columns, two (2) of which are not entered in the database.

TRACKING NUMBER

The first column, Tracking No., is where you record the number on the disc clipped to the fish when it is in the round state (explained in Procedure section). The tracking number is used to match the round measurements on the CF form with the dressed measurements on the Set Form C before an otolith number has been assigned to that fish. These numbers are not unique and may repeat.

ROUND WEIGHT

Record the round weight as displayed on the scale

ROUND LENGTH

Measure the fish in round state using the measuring cradle.

REMARKS

Use this field to take notes that will help you keep track of fish or any other remarks you find helpful. This info will not be entered into a database. Information about specific fish is best saved for the Set Form C.

PROCEDURE

1. Shack sampler determines if a fish is to be sampled for round weight and length. The shack sampler will tell you which sizes are desired. The only time you will not sample for round weight and length is when fishing is too heavy to keep up with the work or when there are far more fish available than CF samples needed for a species for which you are collecting CF data.
2. Record round weight and length on the CF form. The otolith number will be added when the fish is ready for LSMO sampling, after it has been dressed by the crew.
3. Clip a numbered snap on the fish, convey number to shack sampler.

4. Give the fish back to the crew for dressing.
5. After the fish has been dressed, tell the shack sampler the number on the snap so the shack sampler can write the otolith number on the CF form.
6. Remove numbered snap
7. Weigh it and collect LSMO data on Set form C.

TRACKING SAMPLES FOR STRATIFICATION

To obtain the best CF, it is important to spread the sample within each Charter region and to collect measurements from as broad a size range as possible. To that end, you have been supplied with a table to help track your samples of each species (shown below). The tables have a column for length, based on the maximum and minimum lengths of that species captured on our surveys over the last few years, and a column for each third of the charter region, divided in to a northern, a central, and a southern sector. Use the tables to make sure your sample is spread as evenly as possible. When you take a CF sample, record that sample in the appropriate box. The catch table in the Survey manual has stations shaded by geographic sector.

CF tracking table

Redbanded			
Length (cm)	Northern 1/3	Middle 1/3	Southern 1/3
25			
26	x		
27			
28			
29			
30			
31	x		
32			
33		x	x
34			
35		x	

CF Data submission

Please fax your CF data forms with your end of trip packets. Include them with your EOT forms (not your set forms) that are mailed to the Seattle office. The tracking sheets are for your own use and do not need to be mailed because we will have this information when the Set Form Cs and the CF sheets are key punched.

MISCELLANY

20 hook count

Because you are completing a Hook Tally Form for a set, you are NOT required to complete "Part 2: Subsample" on the back of the Set Form A. You still must complete "Part 1: Whole Haul Sample" for missing bait, bent/broken/missing hooks, marine mammals and seabirds.

Data editing

The total number of rockfish in your hook-by-hook tally will equal the total number of samples on the suite of Set Form Cs for that set (corrected for fish lost at roller).

Lost hook tally form

If a hook tally form is washed or blown overboard during a haul, get a new form and collect as much data as possible and write an explanation on the form, logbook, and Set Form A. If a hook tally form is lost at the end of a set, use a blank form, with header info, to indicate that is was lost.

End of Trip Summary in your logbook

Include the last otolith number of each rockfish species in the End of Trip Summary in your logbook.

Mailing data forms

Collate the Set Form Cs with the Set Form A and Set Form Bs for each set.

Keep the Hook Tally Forms separate. When you are preparing to mail the data packets clip the Hook Tally Forms by trip.

Evaluations

Your feedback on any aspect of this project is welcomed at any time throughout the season.

The lead, second and third samplers should each fill out an evaluation of the project at the end of their time on the vessel, or at the end of the project, whichever occurs first. These **special project evaluations** are in the Admin pack. Mail completed evaluations with end of trip documents.

Vessel Logbooks

There is no requirement for the IPHC sampler to fill out the vessel logbook; this is solely the responsibility of the charter vessel captain. Additionally, there is no requirement that the IPHC sampler report catch data to the dockside monitors. This is also the responsibility of the captain. If you have time and would like to do so, you may assist the captain with these responsibilities by sharing bycatch information with him. IPHC surveys are cooperative ventures and we encourage all members of the team to work together to complete the charter.

APPENDIX 1: HOOK TALLY CODES

Round and Flat Fish			
IPHC Species Code	Common Name	Scientific Name	Hook Tally Code
2	Arrowtooth Flounder	Atheresthes stomias	A
12	Dover Sole	Microstomus pacificus	DS
64	Flatfish, unident.	Pleuronectiformes	UF
3	Flathead Sole	Hippoglossoides elassodon	FS
37	Giant Wrymouth	Delolepis gigantia	WE
148	Great Sculpin	Myoxocephalus polyacanthocephalus	GS
16	Greenland Turbot	Reinhardtius hippoglossoides	GT
23	Greenling, unident.	Hexagrammidae	G
42	Grenadier (Rattail), unident.	Macrouridae	RT
152	Kamchatka Flounder	Atheresthes evermanni	KF
21	Lingcod	Ophiodon elongatus	LC
26	Pacific Cod	Gadus macrocephalus	C
86	Pacific Hake	Merluccius productus	PH
1	Pacific Halibut	Hippoglossus stenolepis	H
14	Petrale Sole	Eopsetta jordani	P
145	Red Irish Lord	Hemilepidotus hemilepidotus	RL
4	Rock Sole, unident.	Lepidopsetta sp.	RS
34	Ronquil, unident.	Bathymasteridae	RQ
27	Sablefish (Blackcod)	Anoplopoma fimbria	BC
20	Salmon, unident	Salmonidae	SA
29	Sculpin, unident.	Cottidae	SC
56	Spotted Ratfish	Hydrolagus colliei	RF
28	Walleye Pollock	Theragra chalcogramma	PO
146	Yellow Irish Lord	Hemilepidotus jordani	YL

Rockfish			
IPHC Species Code	Common Name	Scientific Name	Hook Tally Code
132	Blackgill Rockfish	Sebastes melanostomus	BG
127	Bocaccio	Sebastes paucispinis	BO
57	Canary Rockfish	Sebastes pinniger	CA
88	China Rockfish	Sebastes nebulosus	CH
58	Dusky Rockfish	Sebastes ciliatus	DR
154	Greenstriped Rockfish	Sebastes elongatus	GN
59	Northern Rockfish	Sebastes polyspinis	NR
87	Quillback Rockfish	Sebastes maliger	QB
90	Redbanded Rockfish	Sebastes babcocki	RB
121	Rosethorn Rockfish	Sebastes helvomaculatus	RO
31	Rougheye Rockfish	Sebastes aleutianus	RE
119	Shortraker Rockfish	Sebastes borealis	SR
60	Silvergray Rockfish	Sebastes brevispinis	SG
45	Unident. Rockfish	Sebastes spp	R
136	Widow Rockfish	Sebastes entomelas	WI
89	Yelloweye Rockfish	Sebastes ruberrimus	YE
128	Yellowmouth Rockfish	Sebastes reedi	YM
122	Yellowtail Rockfish	Sebastes flavidus	YT

Skates and Sharks			
IPHC Species Code	Common Name	Scientific Name	Hook Tally Code
137	Alaska Skate	Bathyraja parmifera	AK
138	Aleutian Skate	Bathyraja aleutica	AL
167	Bering Skate	Bathyraja interrupta	BE
141	Big Skate	Raja binoculata	BI
140	Black Skate	Bathyraja trachura	BS
126	Blue Shark	Prionace glauca	BL
169	Commander Skate	Bathyraja lindbergi	CK
168	Golden Skate	Bathyraja smirnovi	GO
143	Longnose Skate	Raja rhina	LN
142	Sandpaper Skate	Bathyraja kincaida	SD
63	Shark, unident.	Elasmobranchii	SH
55	Skate, unident.	Rajidae	SK
125	Sleeper Shark	Somniosus pacificus	SS
129	Soupfin Shark	Galeorhinus zyopterus	SF
54	Spiny Dogfish	Squalus acanthias	D
156	Whiteblotched Skate	Bathyraja maculata	W

Invertebrates			
IPHC Species Code	Common Name	Scientific Name	Hook Tally Code
211	Basketstar	Gorgonocephalus eucnemis	BK
106	Bryozoa, unident.	Bryozoa	BZ
95	Coral, unident.	(includes hard and soft)	CO
209	Fish-eating Star	Stylasterias Forreri	FE
218	Glass Sponge, unident.	Hexactinellida	GL
51	Octopus, unident.	Octopoda	O
52	Scallop, unident.	Pectinid	US
93	Sea Anemone, unident.	Actiniaria	AN
73	Sea Cucumber, unident.	Holothuroidea	CU
92	Sea Pen, unident.	Pennatulacea	SE
82	Sea Urchin, unident.	Echinoidea	SU
103	Shells, unident.	(includes bivalve and gastropods)	SL
91	Sponge, unident.	Porifera	SP
81	Starfish, unident.	(includes brittle and basketstars)	ST
210	Sunflower Sea Star	Pycnopodia helianthoides	SN

Other	
IPHC Species Code	Common Name
100	Inanimate Object
296	Unidentified plant matter

APPENDIX 2: PREDICTED ROCKFISH ENCOUNTERS FOR 2010

The following tables list the average rockfish catch at each station from 2007-2009. The numbers have been scaled to reflect anticipated catch on 8 skates. Use these tables to predict the amount of work at each station and whether you will need to prepare to subsample rockfish on a set. Stations not listed are ones that did not catch any rockfish in 2007-2009.

2010 Vancouver Predictions

Station number	Blackspotted Rockfish	Bocaccio	Canary Rockfish	China Rockfish	Copper Rockfish	Greenstriped Rockfish	Quillback Rockfish	Redbanded Rockfish	Rosethorn Rockfish	Rougheye Rockfish	Shortraker Rockfish	Silvergray Rockfish	Tiger Rockfish	Yelloweye Rockfish	Total Rockfish Prediction	Halibut Prediction
2001		1												1	2	71
2002								3		7	4	2			15	21
2005						2								45	46	32
2006								19				2		2	23	136
2007							18							6	24	32
2008							2							7	9	15
2011								2							2	39
2012				6			9							4	19	49
2013							6							9	15	34
2014			2												2	10
2015		2						2						1	5	62
2016							3								3	74
2018		2						4							6	98
2020														9	9	46
2024			5	2			5		2			2		45	60	62
2026								6						3	9	107
2027					2		1								4	54
2028		2													2	51
2029												2			2	86
2031		2						14						7	22	175
2033		3	3					10						15	32	110
2034							5							4	9	104
2035		6	5					31				3		27	73	72
2037		1						38				2		15	56	80
2038		2	9				9		1			2		20	43	74
2039			1					4				3		5	14	23
2040			2				7							2	11	53
2042		1	1				6							7	15	63
2043								2							2	123

Appendix 2: Predicted rockfish encounters in 2010
Based on average encounters 2007-2009,
scaled for 8 skates

2010 Goose Island Predictions

Station number	Blackspotted Rockfish	Bocaccio	Canary Rockfish	Greenstriped Rockfish	Quillback Rockfish	Redbanded Rockfish	Rosethorn Rockfish	Rougheye Rockfish	Shortraker Rockfish	Silvergray Rockfish	Tiger Rockfish	Yelloweye Rockfish	Yellowmouth Rockfish	Total Rockfish Prediction	Halibut Prediction
2044			1		3							18		22	48
2045		1		1						13		43		59	114
2046												6		6	91
2047												1		1	70
2049										1		2		3	56
2050	1	3				42				4		10	2	62	19
2051			3		2							16		21	11
2052						4							2	6	51
2054		2								1		2		5	161
2055						9		3	3				1	17	74
2056						2								2	34
2057												6		6	50
2060				2		3				2		2		8	13
2061		2	2			14		2	1					20	88
2062			2			19		2	5					26	63
2063						7						1	1	10	65
2064						7						1		8	15
2065					10					2		53		65	90
2066						5		2						6	35
2069					1							16		17	151
2070		4			2							99		104	125
2071			3			6				8		105	2	124	51
2072						31		1	5	1			2	41	34
2073			2			8						3		13	37
2076					1							7		8	106
2077						21		10	7			5	2	45	25
2078					8	29						6		43	62
2079		2												2	278
2080		3			5							16		24	138
2081		2	1							2				5	45
2082						26		17	9					52	48
2083						94						2		96	38
2084		2										9		10	99
2085						27								27	6
2086	1					78		2		2		5		88	31

Appendix 2: Predicted rockfish encounters in 2010
Based on average encounters 2007-2009,
scaled for 8 skates

2010 St. James Predictions

Station number	Blackspotted	Bocaccio	Canary	China	Darkblotched	Greenstriped	Quillback	Redbanded	Rosethorn	Rougheye	Shortraker	Silvergray	Tiger	Yelloweye	Yellowmouth	Total Rockfish Prediction	Halibut Prediction
2087								18		15	10				2	44	24
2088	1				2			27		1	2				5	38	55
2089								19		5	1					26	19
2090		2	1					6				6		48		64	57
2091		2						20				5		42		69	80
2092	14							4		8	5				2	32	42
2093		10	2					23				5		109	1	149	46
2094								38						17		55	29
2095		1	1			1						3		29		36	215
2096			2									1		1		5	160
2097								1		5						6	5
2098		1						6								7	34
2099			1					4				4		3		12	26
2100		3	3					41						64		111	35
2101								8								8	14
2102								17				1				19	9
2103								59				2				60	13
2104			6					2				2				10	82
2105										3	1					4	2
2106			2					14				2		7		24	61
2107								7								7	77
2108								8						2		11	185
2109								26								26	46
2110								129				2				131	41
2111								23				2				25	27
2112								6		1						8	13
2113								4						4		8	30
2115				1			5							18		24	98
2116	1	2						16				1		15		35	75
2117								46		2	1					49	58
2118								11	2	3		1				17	50
2119			7				1					2	2	44		56	69
2120							6					1		14		21	58
2121		2						24				2		3		30	35
2122								24		10	5					39	19
2123								60		2		1				62	30
2124								2				2		38		42	56
2125								24		3	2					29	18
2126								25								25	19
2127								57				2		2		60	27
2128		1	2					48				1		2		55	29

Appendix 2: Predicted rockfish encounters in 2010
Based on average encounters 2007-2009,
scaled for 8 skates

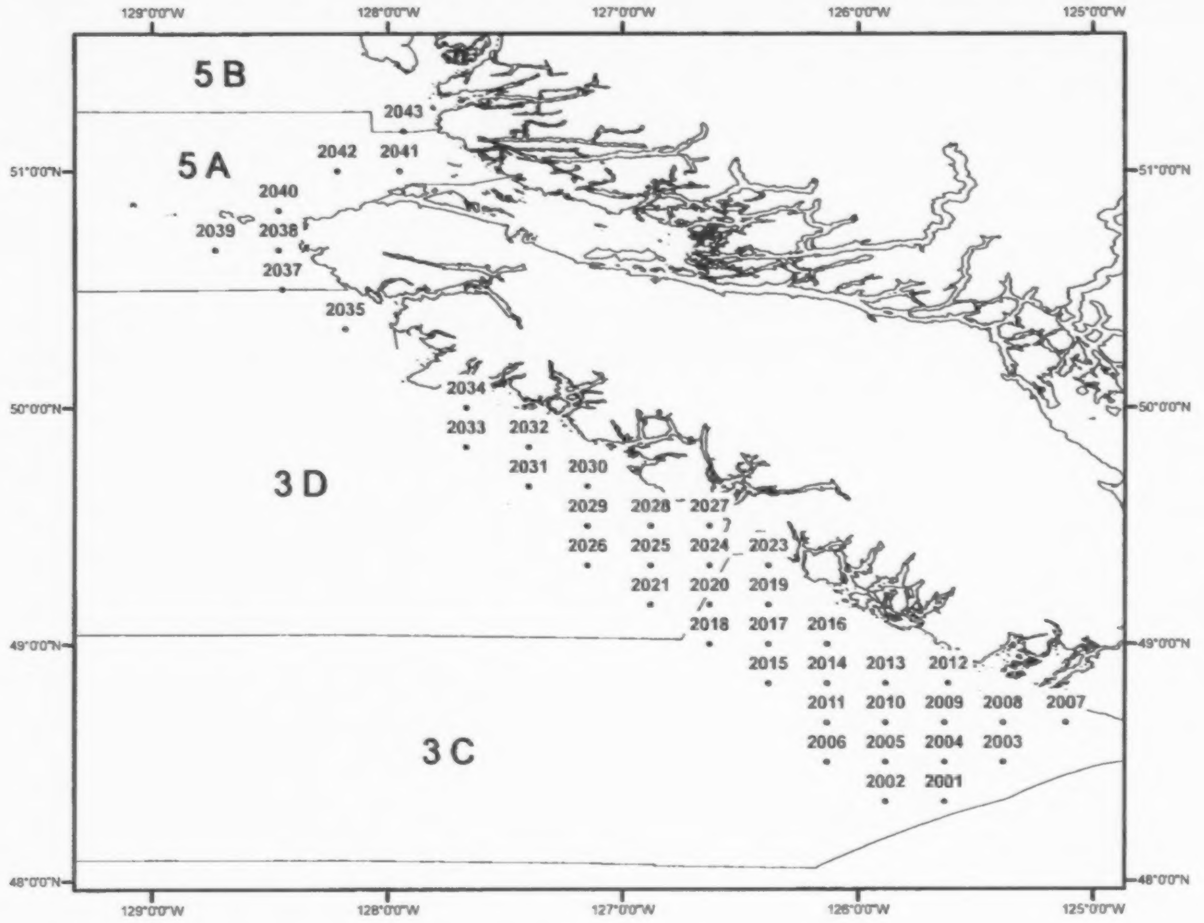
2010 Charlotte Predictions

Station number	Blackspotted Rockfish	Bocaccio	Canary Rockfish	China Rockfish	Copper Rockfish	Darkblotched Rockfish	Greenstriped Rockfish	Quillback Rockfish	Redbanded Rockfish	Rosethorn Rockfish	Rougheye Rockfish	Shortraker Rockfish	Silvergray Rockfish	Tiger Rockfish	Yelloweye Rockfish	Yellowmouth Rockfish	Yellowtail Rockfish	Total Rockfish Prediction	Halibut Prediction
2129								10					2		15			27	77
2130	1		1					2					1		5			11	37
2131		1																1	16
2132								2							1			3	58
2133													2		5			6	33
2135									58		2	1						61	25
2136		2																2	18
2137									32						15			47	37
2138									17									17	16
2139															1			1	17
2140								3							3			6	37
2141		2						13		2					37			53	150
2142								2	3						1			6	85
2143		5	3					6		2			16		14			45	93
2144		2					2				2		9			3		18	112
2146		3							24		64	27						118	25
2147					10													10	34
2148					1													1	119
2149		2	4										7		32			45	178
2151			8					12					4		31			56	97
2152								6										6	17
2154		1											2				2	4	81
2156			4	4				28							24			60	64
2157	8										92	11						111	11
2158								9	1		1				6			18	31
2160									64									64	128
2161									9				19					28	91
2162									16		13	2						30	43
2163									21		19	3	6		1			51	95
2164									11		53	5						69	42
2165											18	2						20	57
2166											28	2						30	57
2167		2							73				12		43			129	87
2168									4				1		1			6	160
2169								2				2			2			5	23
2170									5						2			7	77
2171			4			2		3	4				2		19			34	173
2172												2						2	21

Appendix 2: Predicted rockfish encounters in 2010
Based on average encounters 2007-2009,
scaled for 8 skates

APPENDIX 3: IPHC STATIONS BY DFO AREA

Vancouver Stations

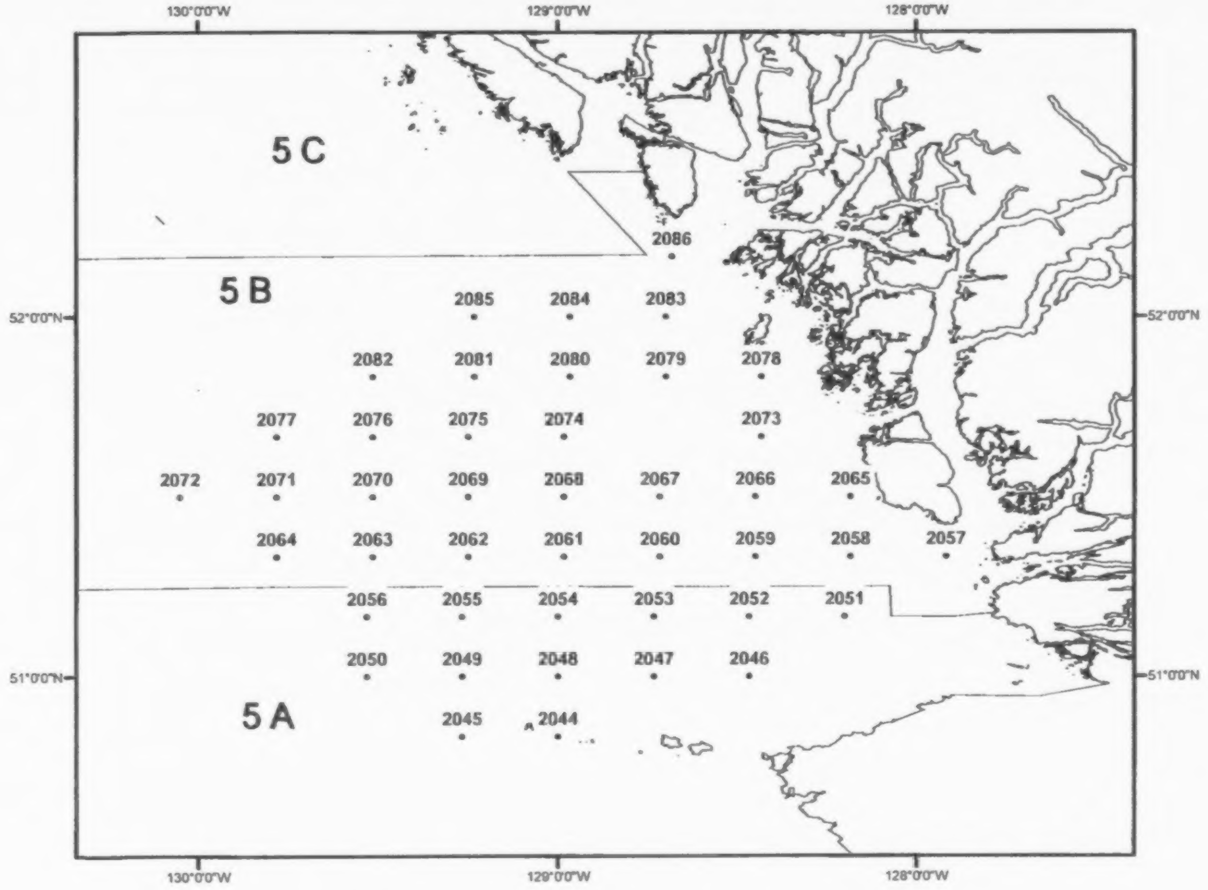

129°0'0"W
128°0'0"W
127°0'0"W
126°0'0"W
125°0'0"W
51°0'0"N
50°0'0"N
49°0'0"N
48°0'0"N
5 B
5 A
3 D
3 C
2043
2042
2041
2040
2039
2038
2037
2035
2034
2033
2032
2031
2030
2029
2028
2027
2026
2025
2024
2023
2021
2020
2019
2018
2017
2016
2015
2014
2013
2012
2011
2010
2009
2008
2007
2006
2005
2004
2003
2002
2001

IPHC Station Number	DFO Area
2001	3C
2002	3C
2003	3C
2004	3C
2005	3C
2006	3C
2007	3C
2008	3C
2009	3C
2010	3C
2011	3C
2012	3C
2013	3C
2014	3C

IPHC Station Number	DFO Area
2015	3C
2016	3C
2017	3C
2018	3C
2019	3C
2020	3C
2021	3D
2023	3C
2024	3D
2025	3D
2026	3D
2027	3D
2028	3D
2029	3D

IPHC Station Number	DFO Area
2030	3D
2031	3D
2032	3D
2033	3D
2034	3D
2035	3D
2037	3D
2038	5A
2039	5A
2040	5A
2041	5A
2042	5A
2043	5B

Goose Island Stations


130°0'0"W
129°0'0"W
128°0'0"W
5 C
2086
5 B
2085
2084
2083
52°0'0"N
2082
2081
2080
2079
2078
2077
2076
2075
2074
2073
2072
2071
2070
2069
2068
2067
2066
2065
2064
2063
2062
2061
2060
2059
2058
2057
2056
2055
2054
2053
2052
2051
2050
2049
2048
2047
2046
51°0'0"N
5 A
2045
2044
130°0'0"W
129°0'0"W
128°0'0"W

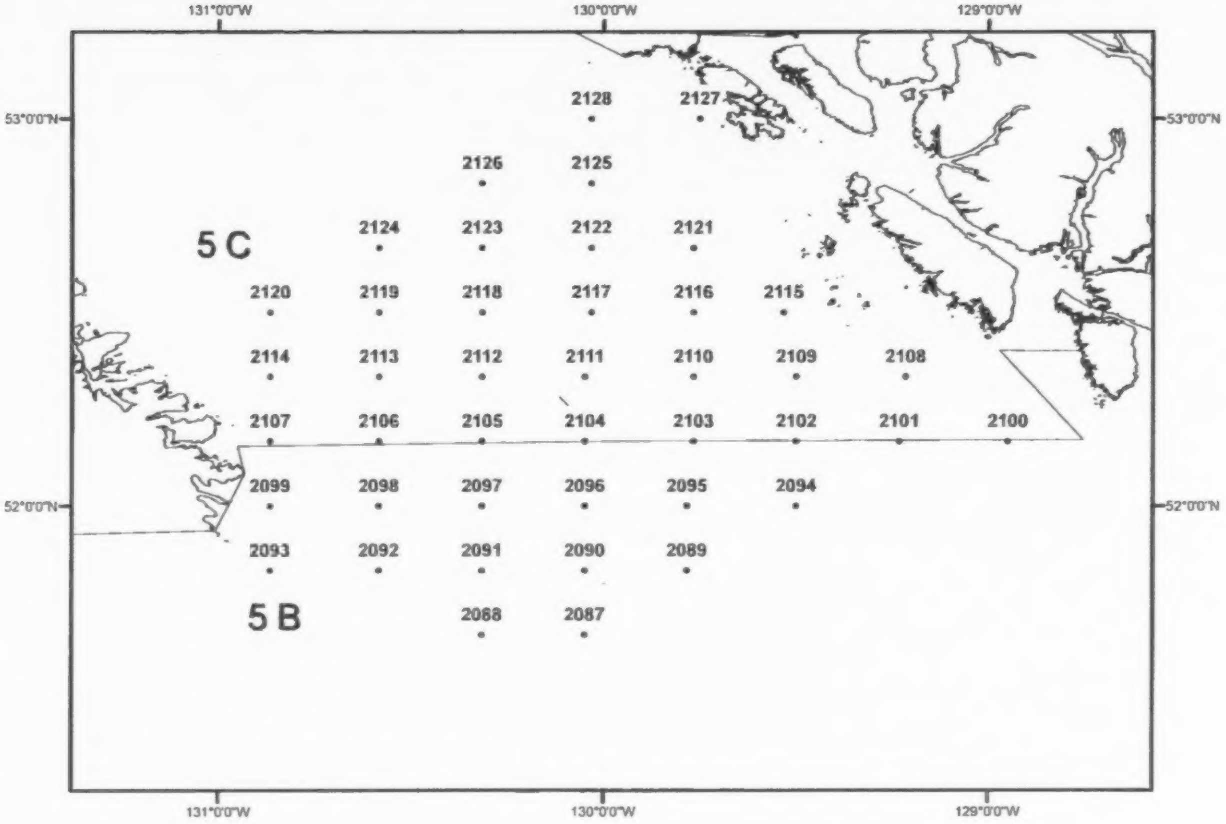
IPHC Station Number	DFO Area
2044	5A
2045	5A
2046	5A
2047	5A
2048	5A
2049	5A
2050	5A
2051	5A
2052	5A
2053	5A
2054	5A
2055	5A
2056	5A
2057	5B
2058	5B

IPHC Station Number	DFO Area
2059	5B
2060	5B
2061	5B
2062	5B
2063	5B
2064	5B
2065	5B
2066	5B
2067	5B
2068	5B
2069	5B
2070	5B
2071	5B
2072	5B

IPHC Station Number	DFO Area
2073	5B
2074	5B
2075	5B
2076	5B
2077	5B
2078	5B
2079	5B
2080	5B
2081	5B
2082	5B
2083	5B
2084	5B
2085	5B
2086	5B

Appendix 3: IPHC stations byDFO area

St. James Stations



131°0'0"W
130°0'0"W
129°0'0"W
53°0'0"N
52°0'0"N
2128
2127
2126
2125
5 C
2124
2123
2122
2121
2120
2119
2118
2117
2116
2115
2114
2113
2112
2111
2110
2109
2108
2107
2106
2105
2104
2103
2102
2101
2100
2099
2098
2097
2096
2095
2094
2093
2092
2091
2090
2089
5 B
2088
2087

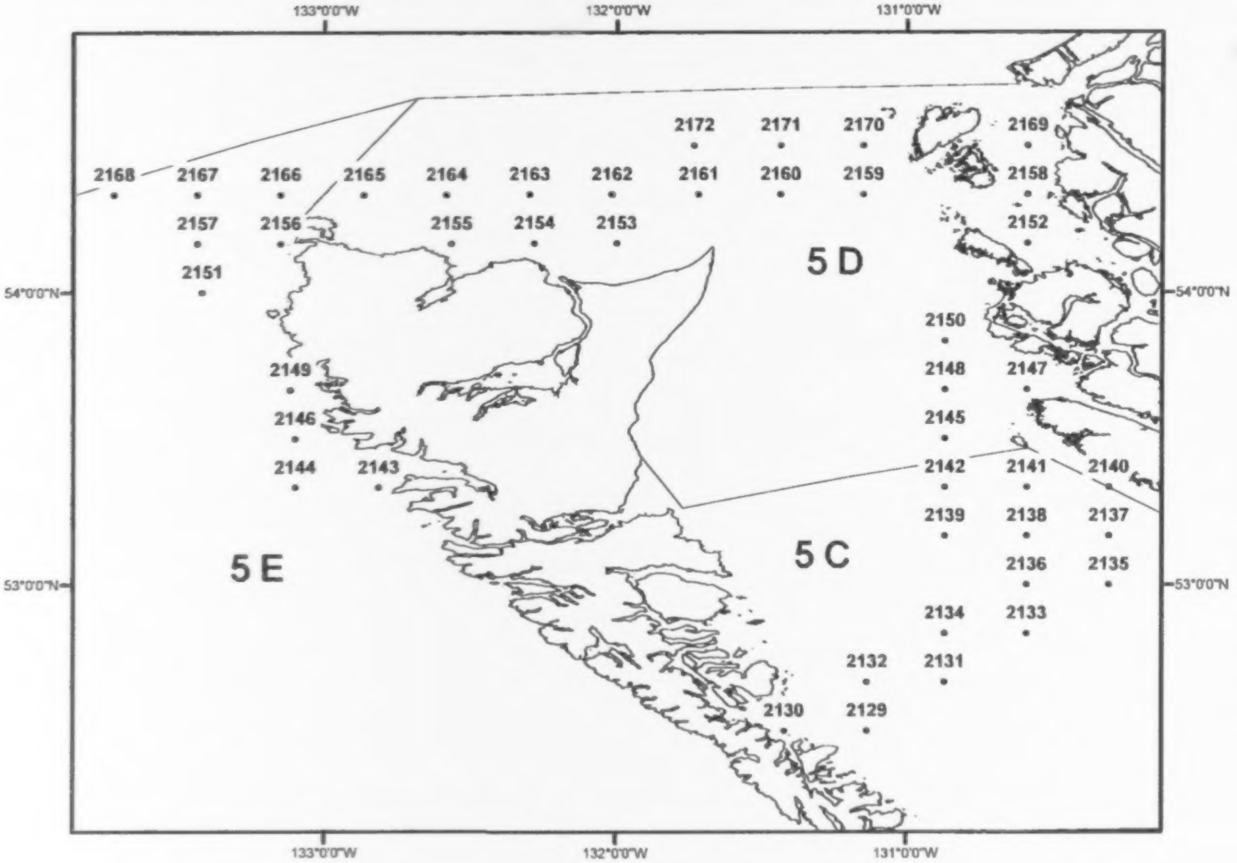
IPHC Station Number	DFO Area
2087	5B
2088	5B
2089	5B
2090	5B
2091	5B
2092	5B
2093	5B
2094	5B
2095	5B
2096	5B
2097	5B
2098	5B
2099	5B
2100	5B

IPHC Station Number	DFO Area
2101	5B
2102	5B
2103	5B
2104	5C
2105	5C
2106	5C
2107	5C
2108	5C
2109	5C
2110	5C
2111	5C
2112	5C
2113	5C
2114	5C

IPHC Station Number	DFO Area
2115	5C
2116	5C
2117	5C
2118	5C
2119	5C
2120	5C
2121	5C
2122	5C
2123	5C
2124	5C
2125	5C
2126	5C
2127	5C
2128	5C

Appendix 3: IPHC stations byDFO area

Charlotte Stations


133°0'0"W
132°0'0"W
131°0'0"W
54°0'0"N
53°0'0"N
2172
2171
2170
2169
2168
2167
2166
2165
2164
2163
2162
2161
2160
2159
2158
2157
2156
2155
2154
2153
2152
2151
5 D
2150
2149
2148
2147
2146
2145
2144
2143
2142
2141
2140
2139
2138
2137
5 E
5 C
2136
2135
2134
2133
2132
2131
2130
2129

IPHC Station Number	DFO Area
2044	5A
2045	5A
2046	5A
2047	5A
2048	5A
2049	5A
2050	5A
2051	5A
2052	5A
2053	5A
2054	5A
2055	5A
2056	5A
2057	5B
2058	5B

IPHC Station Number	DFO Area
2059	5B
2060	5B
2061	5B
2062	5B
2063	5B
2064	5B
2065	5B
2066	5B
2067	5B
2068	5B
2069	5B
2070	5B
2071	5B
2072	5B

IPHC Station Number	DFO Area
2073	5B
2074	5B
2075	5B
2076	5B
2077	5B
2078	5B
2079	5B
2080	5B
2081	5B
2082	5B
2083	5B
2084	5B
2085	5B
2086	5B

Appendix 3: IPHC stations byDFO area

APPENDIX 4: RANDOM NUMBER TABLE

	0-5%	5-10%	10-15%	15-20%	20-25%	25-30%	30-35%	35-40%	40-45%	45-50%	50-55%	55-60%	60-65%	65-70%	70-75%	75-80%	80-85%	85-90%	90-95%	95-100	
1	X	X	0	0	0	0	0	0	0	X	0	X	X	X	0	0	X	X	0	X	1
2	0	0	0	0	0	0	X	X	X	0	X	X	0	X	0	X	0	X	0	X	2
3	0	0	0	0	0	0	X	X	X	0	0	X	X	0	X	0	X	X	X	X	3
4	0	0	0	0	0	0	0	0	0	0	X	0	0	X	0	X	X	X	X	X	4
5	0	0	X	X	0	0	X	0	0	X	0	0	X	X	X	X	X	X	X	X	5
6	0	0	0	0	0	0	0	X	X	X	X	X	0	0	0	X	0	X	X	X	6
7	0	0	0	X	0	0	0	X	0	0	X	0	0	0	0	0	0	X	X	X	7
8	0	0	0	0	0	0	X	X	0	X	0	0	X	X	X	X	X	0	X	0	8
9	0	0	0	0	0	0	0	0	0	X	0	0	0	0	X	0	X	X	X	X	9
10	0	X	0	0	X	0	0	X	X	0	X	0	X	X	0	X	X	X	X	X	10
11	0	0	0	0	X	X	0	X	0	X	0	0	X	X	X	X	0	X	0	X	11
12	0	0	0	X	0	0	0	X	0	0	X	X	X	X	X	X	X	X	X	X	12
13	0	0	0	0	X	0	X	X	X	0	X	X	0	X	X	X	X	X	X	X	13
14	0	0	0	0	0	0	X	X	0	0	0	X	X	X	X	X	X	0	X	X	14
15	0	0	0	X	0	0	0	X	X	0	X	X	0	X	X	X	X	X	0	X	15
16	0	0	0	0	X	0	0	X	0	X	0	0	X	X	X	0	X	X	X	X	16
17	0	X	0	0	0	X	0	0	X	0	X	0	0	0	X	X	X	X	X	X	17
18	0	0	0	0	0	0	0	0	X	X	0	X	X	X	X	0	X	X	X	X	18
19	0	0	0	0	0	0	X	X	0	X	0	0	0	0	X	X	X	X	X	X	19
20	0	0	0	0	0	0	X	0	0	X	X	X	0	X	0	X	X	X	X	0	20
21	0	0	0	0	0	0	X	X	X	0	0	0	X	0	X	X	0	X	X	X	21
22	0	0	0	0	0	X	X	X	0	X	X	X	0	0	0	X	X	X	X	X	22
23	0	0	0	0	0	0	X	X	0	X	X	0	X	X	X	X	X	X	X	X	23
24	0	0	0	0	0	0	0	X	0	X	X	0	X	X	X	0	X	X	X	X	24
25	0	0	0	0	X	0	0	X	0	0	X	X	X	X	0	0	X	X	X	X	25
26	0	0	0	0	0	X	0	0	0	X	0	0	X	X	X	X	X	X	X	X	26
27	0	0	0	0	0	0	X	X	0	X	0	X	X	X	X	X	X	X	X	X	27
28	0	0	0	0	0	X	0	0	X	X	0	X	0	X	X	X	X	X	X	X	28
29	0	0	0	0	0	0	0	X	X	X	0	X	X	X	X	X	0	X	X	X	29
30	0	0	0	0	0	0	0	0	0	X	X	0	0	X	X	X	X	X	X	X	30
31	0	0	X	X	0	0	0	0	X	X	0	X	X	X	X	X	X	X	X	X	31
32	0	0	0	0	0	0	X	0	X	X	0	X	X	X	X	0	0	X	X	X	32
33	0	0	0	0	0	X	0	0	X	0	X	X	X	X	X	X	X	0	X	X	33
34	0	0	0	0	0	0	X	0	X	X	X	0	X	X	X	X	0	X	X	X	34
35	0	0	X	0	X	0	0	0	X	X	0	0	0	0	0	X	X	X	X	X	35
36	0	0	X	0	X	0	X	0	X	0	0	X	0	0	X	X	X	X	0	X	36
37	X	0	0	0	0	0	0	0	X	0	X	0	X	0	0	X	X	X	X	X	37
38	0	0	0	0	X	0	X	0	0	X	0	0	X	0	X	0	X	X	X	X	38
39	0	X	0	0	X	0	0	X	0	X	X	0	X	X	X	X	X	0	X	X	39
40	0	0	0	0	0	X	0	0	0	0	0	0	X	X	0	X	X	X	X	X	40
41	0	0	0	0	X	0	X	0	X	X	0	X	0	X	X	X	X	X	X	X	41
42	X	X	0	X	0	0	X	X	0	0	X	0	X	X	0	X	X	X	X	X	42
43	0	0	0	X	0	X	0	X	0	X	0	0	X	X	0	X	X	X	X	X	43
44	0	0	X	0	0	0	X	X	0	X	X	X	X	0	X	0	X	X	X	X	44
45	0	0	0	0	0	0	X	0	0	X	X	X	X	X	X	X	X	X	X	X	45
46	0	0	0	0	0	0	X	0	0	0	0	X	X	0	X	X	X	X	X	X	46
47	0	0	0	0	X	0	0	0	X	X	0	X	X	0	X	X	X	X	X	X	47
48	0	0	0	0	0	0	0	X	X	0	0	0	0	0	X	X	X	0	X	X	48
49	0	0	0	0	X	0	X	0	X	0	0	X	0	X	X	X	X	X	X	X	49
50	0	0	X	X	0	0	X	0	0	X	X	X	0	X	X	0	X	X	X	X	50

HOW TO USE THE RANDOM SAMPLE TABLE

In order to do a true random sub-sample, you must wait until all rockfish caught on the set have been brought onboard. If you begin sub-sampling before haul back is finished then every rockfish will not have an equal opportunity to be selected and the sub-sample will not be randomly chosen.

1. Count the total number of pieces in the group you want to sub-sample (eg. 82 yelloweye)
2. Determine the number of fish needed to reach the correct sub-sample size (eg. 50 of 82 yelloweye)
3. Calculate the percentage of the total needed to reach the desired sampling rate, rounding to the nearest percent (eg. 50 out of 82 yelloweye = 61%)
4. Locate the random sample table (RST) column that matches the desired sampling rate. The RST consists of rows of 0's and X's: each digit represents one fish, and indicates whether or not you should include that fish in the sub-sample.

   0 = do not sample

   X = sample this fish
5. Starting at the top of the table in the appropriate column, follow the row down and assign a 0 or X to each fish. To do this the deck sampler should hold the fish up one at a time, and the shack sampler will direct them to eliminate or add the fish to sub-sample, according to the RST. When you reach row 50, start over at the top (row 1) in the same column an continue working down until the desired number of samples is attained. The deck sampler should not be able to read the RST as they choose which fish to present next.

NOTES

Appendix B. Summary of set specifications by vessel, including set number, IPHC station number, date, location (start and end latitudes and longitudes in degrees, decimal minutes), depths (minimum, maximum and average in metres) and times (end deployment and begin retrieval).

Vessel PROUD VENTURE

Set	Station	Date	Start Lat	Start Lon	End Lat	End Lon	Min Depth (m)	Max Depth (m)	Avg. Depth (m)	End Deployment	Begin Retrieval
1	2007	03-Jun-10	48° 39.99'	125° 5.55'	48° 40'	125° 9.38'	33	42	37	5:09 am	11:51 am
2	2008	03-Jun-10	48° 40'	125° 20.91'	48° 40.01'	125° 24.51'	33	42	37	6:35 am	3:30 pm
3	2009	03-Jun-10	48° 40'	125° 36.25'	48° 40'	125° 39.74'	48	98	73	8:08 am	7:02 pm
4	2004	04-Jun-10	48° 28.5'	125° 39.99'	48° 28.5'	125° 36.63'	51	54	52	5:04 am	11:13 am
5	2001	04-Jun-10	48° 21.14'	125° 38'	48° 18.82'	125° 38.02'	76	79	77	6:33 am	2:14 pm
6	2003	04-Jun-10	48° 29'	125° 23'	48° 31.37'	125° 23.05'	63	83	73	9:09 am	6:15 pm
7	2005	05-Jun-10	48° 29.99'	125° 51.26'	48° 30'	125° 54.96'	57	61	59	5:03 am	11:05 am
8	2002	05-Jun-10	48° 21.19'	125° 53'	48° 18.88'	125° 53'	112	240	176	6:49 am	2:09 pm
9	2006	05-Jun-10	48° 30.01'	126° 9.71'	48° 30.01'	126° 6.32'	103	126	114	9:30 am	6:44 pm
10	2011	06-Jun-10	48° 40'	126° 9.98'	48° 39.99'	126° 6.39'	73	86	79	5:06 am	10:39 am
11	2014	06-Jun-10	48° 49.99'	126° 6.55'	48° 50'	126° 10.07'	55	66	60	6:49 am	2:00 pm
12	2015	06-Jun-10	48° 50'	126° 21.24'	48° 50.01'	126° 24.89'	97	100	98	8:11 am	4:59 pm
13	2018	07-Jun-10	48° 59.99'	126° 39.57'	49° 0.02'	126° 36.09'	112	205	158	5:06 am	11:03 am
14	2020	07-Jun-10	49° 9.98'	126° 36.2'	49° 10.01'	126° 39.89'	63	70	66	7:01 am	3:08 pm
15	2021	07-Jun-10	49° 10'	126° 51.16'	49° 9.99'	126° 54.72'	87	107	97	8:24 am	6:04 pm
16	2019	08-Jun-10	49° 10'	126° 24.88'	49° 9.99'	126° 21.52'	43	51	47	5:08 am	10:45 am
17	2017	08-Jun-10	49° 0'	126° 24.15'	49° 0.01'	126° 20.7'	71	78	74	7:05 am	2:28 pm
18	2016	08-Jun-10	48° 59.99'	126° 9.75'	49° 0.01'	126° 6.32'	37	42	39	8:24 am	5:33 pm
19	2010	09-Jun-10	48° 40'	125° 54.87'	48° 40'	125° 51.44'	39	44	41	5:04 am	10:45 am
20	2013	09-Jun-10	48° 50'	125° 54.51'	48° 50'	125° 51.15'	30	34	32	6:55 am	2:38 pm
21	2012	09-Jun-10	48° 50.93'	125° 40.65'	48° 48.63'	125° 40.68'	28	29	28	8:40 am	5:52 pm
22	2023	12-Jun-10	49° 20'	126° 21.11'	49° 20'	126° 24.72'	21	22	21	5:01 am	11:34 am
23	2024	12-Jun-10	49° 19.99'	126° 36.27'	49° 20'	126° 39.71'	33	49	41	6:26 am	3:06 pm
24	2027	12-Jun-10	49° 28.75'	126° 38.01'	49° 31.17'	126° 38.06'	22	23	22	8:01 am	8:41 pm
25	2028	14-Jun-10	49° 29.97'	126° 54.35'	49° 30'	126° 50.64'	37	55	46	5:17 am	12:10 pm
26	2025	14-Jun-10	49° 20'	126° 51.38'	49° 19.99'	126° 54.62'	70	80	75	7:06 am	3:34 pm
27	2026	14-Jun-10	49° 20'	127° 10.67'	49° 20'	127° 7.03'	91	119	105	9:26 am	7:00 pm
28	2029	16-Jun-10	49° 30'	127° 10.58'	49° 30'	127° 6.88'	77	83	80	6:00 am	2:19 pm
29	2030	16-Jun-10	49° 39.99'	127° 10.71'	49° 40'	127° 6.96'	59	65	62	8:43 am	6:25 pm
30	2031	16-Jun-10	49° 39.98'	127° 22.26'	49° 39.97'	127° 25.02'	85	190	137	11:30 am	10:03 pm
31	2032	17-Jun-10	49° 50'	127° 25.87'	49° 49.99'	127° 22.45'	43	47	45	5:07 am	12:45 pm
32	2033	17-Jun-10	49° 50.01'	127° 41.4'	49° 50'	127° 37.64'	72	100	86	7:50 am	4:13 pm
33	2034	17-Jun-10	50° 0'	127° 41.52'	50° 0'	127° 38.19'	44	53	48	10:11 am	8:05 pm
34	2035	18-Jun-10	50° 18.86'	128° 11'	50° 21.04'	128° 10.99'	85	91	88	5:02 am	10:15 am
35	2037	18-Jun-10	50° 31.18'	128° 27'	50° 28.75'	128° 27'	101	104	102	7:46 am	3:18 pm
36	2040	21-Jun-10	50° 48.88'	128° 27.99'	50° 51.33'	128° 27.99'	28	40	34	5:05 am	11:13 am
37	2038	21-Jun-10	50° 39.99'	128° 26.31'	50° 40.01'	128° 30.03'	39	53	46	7:11 am	2:54 pm
38	2039	21-Jun-10	50° 39.99'	128° 42.15'	50° 40'	128° 45.69'	100	109	104	8:36 am	6:21 pm
39	2042	22-Jun-10	50° 58.89'	128° 12.98'	51° 1.17'	128° 13.04'	42	72	57	5:24 am	11:00 am
40	2043	22-Jun-10	51° 11.02'	127° 55.96'	51° 8.59'	127° 56'	65	75	70	7:49 am	3:09 pm
41	2041	22-Jun-10	51° 0'	127° 55.21'	50° 59'	127° 58.78'	61	65	63	9:17 am	6:32 pm
42	2046	23-Jun-10	50° 59.04'	128° 27.99'	51° 1.36'	128° 28'	51	53	52	5:01 am	11:05 am
43	2052	23-Jun-10	51° 9.02'	128° 28'	51° 11.42'	128° 27.98'	101	108	104	6:25 am	3:09 pm
44	2051	23-Jun-10	51° 10'	128° 13.76'	51° 10'	128° 9.87'	49	61	55	8:12 am	7:01 pm

Appendix B continued on next page.

Vessel PROUD VENTURE

Set	Station	Date	Start Lat	Start Lon	End Lat	End Lon	Min Depth (m)	Max Depth (m)	Avg. Depth (m)	End Deployment	Begin Retrieval
45	2047	24-Jun-10	51° 0'	128° 42.2'	51° 0'	128° 46.11'	34	37	35	5:01 am	11:16 am
46	2059	30-Jun-10	51° 19.99'	128° 25.33'	51° 20.01'	128° 29.43'	82	86	84	5:01 am	10:39 am
47	2060	30-Jun-10	51° 20'	128° 41.33'	51° 20'	128° 45.15'	113	118	115	6:19 am	2:28 pm
48	2053	30-Jun-10	51° 11.17'	128° 44'	51° 8.86'	128° 44.01'	49	64	56	7:56 am	6:10 pm
49	2068	01-Jul-10	51° 29.98'	129° 0.95'	51° 30'	128° 57.23'	24	27	25	5:10 am	11:25 am
50	2069	01-Jul-10	51° 30'	129° 14.03'	51° 30.01'	129° 18.03'	27	29	28	6:27 am	2:56 pm
51	2062	01-Jul-10	51° 19.99'	129° 16.77'	51° 20'	129° 13.28'	123	131	127	8:55 am	6:43 pm
52	2077	02-Jul-10	51° 41.18'	129° 47'	51° 38.86'	129° 47'	112	170	141	5:18 am	11:22 am
53	2071	02-Jul-10	51° 29.99'	129° 45.17'	51° 30'	129° 48.86'	90	98	94	6:54 am	3:52 pm
54	2072	02-Jul-10	51° 29.98'	130° 4.69'	51° 30.01'	130° 1.31'	142	202	172	8:46 am	9:08 pm
55	2061	04-Jul-10	51° 19.99'	129° 0.67'	51° 20'	128° 57.13'	132	139	135	5:56 am	12:51 pm
56	2054	04-Jul-10	51° 9.99'	128° 58.04'	51° 10'	129° 1.81'	72	75	73	7:49 am	5:09 pm
57	2055	04-Jul-10	51° 9.99'	129° 13.8'	51° 10'	129° 17.38'	125	152	138	9:29 am	8:30 pm
58	2056	05-Jul-10	51° 10'	129° 33.84'	51° 10'	129° 30.23'	155	158	156	5:02 am	11:16 am
59	2050	05-Jul-10	50° 59.99'	129° 33.69'	50° 59.99'	129° 30.05'	124	140	132	7:00 am	3:28 pm
60	2049	05-Jul-10	51° 0'	129° 17.7'	51° 0'	129° 13.97'	85	93	89	8:29 am	8:05 pm
61	2045	06-Jul-10	50° 49.99'	129° 17.48'	50° 49.99'	129° 13.58'	53	73	63	7:04 am	12:53 pm
62	2044	06-Jul-10	50° 50'	129° 1.75'	50° 49.99'	128° 58.1'	45	51	48	8:28 am	5:06 pm
63	2048	06-Jul-10	50° 59.98'	128° 58.38'	50° 59.99'	129° 2.4'	44	49	46	10:50 am	8:52 pm
64	2057	09-Jul-10	51° 20'	127° 53.16'	51° 20.01'	127° 56.91'	39	86	62	5:01 am	10:44 am
65	2058	09-Jul-10	51° 20'	128° 9.26'	51° 19.98'	128° 12.96'	34	51	42	6:25 am	2:06 pm
66	2065	09-Jul-10	51° 28.92'	128° 11.01'	51° 31.24'	128° 11'	36	48	42	8:01 am	5:20 pm
67	2073	10-Jul-10	51° 40.01'	128° 24.19'	51° 40'	128° 27.93'	77	79	78	5:01 am	10:32 am
68	2066	10-Jul-10	51° 30'	128° 25.41'	51° 30'	128° 29.22'	100	104	102	6:45 am	2:08 pm
69	2067	10-Jul-10	51° 30'	128° 41.21'	51° 30'	128° 44.8'	24	69	46	8:05 am	5:26 pm
70	2080	11-Jul-10	51° 49.98'	128° 59.75'	51° 49.99'	128° 56.33'	40	52	46	5:00 am	11:55 am
71	2074	11-Jul-10	51° 40'	128° 57.18'	51° 40'	129° 1.07'	24	37	30	6:59 am	3:09 pm
72	2075	11-Jul-10	51° 39.97'	129° 17.75'	51° 39.99'	129° 13.72'	25	33	29	9:28 am	6:45 pm
73	2078	12-Jul-10	51° 51.11'	128° 25.98'	51° 48.69'	128° 26'	65	92	78	5:05 am	11:48 am
74	2079	12-Jul-10	51° 50'	128° 40.34'	51° 50'	128° 44.26'	42	72	57	7:03 am	3:50 pm
75	2083	12-Jul-10	51° 59.98'	128° 43.53'	52° 0'	128° 40.04'	88	91	89	9:10 am	7:39 pm
76	2084	13-Jul-10	52° 0'	128° 59.86'	51° 59.99'	128° 56.15'	64	86	75	5:05 am	11:32 am
77	2100	13-Jul-10	52° 9.99'	128° 58.68'	52° 10'	128° 54.93'	86	94	90	7:24 am	3:18 pm
78	2086	13-Jul-10	52° 10'	128° 42.67'	52° 10'	128° 39.02'	108	128	118	8:51 am	7:23 pm
79	2108	14-Jul-10	52° 21.05'	129° 13.01'	52° 18.63'	129° 13'	77	89	83	5:02 am	12:17 pm
80	2109	14-Jul-10	52° 20.96'	129° 30.03'	52° 18.44'	129° 30'	86	102	94	7:18 am	4:01 pm
81	2115	14-Jul-10	52° 29.99'	129° 33.57'	52° 30.04'	129° 29.91'	35	56	45	9:41 am	7:59 pm
82	2127	15-Jul-10	52° 59.99'	129° 46.75'	53° 0'	129° 42.89'	112	130	121	5:06 am	10:59 am
83	2125	15-Jul-10	52° 50'	130° 0.25'	52° 50.01'	130° 3.94'	139	143	141	7:31 am	3:35 pm
84	2128	15-Jul-10	52° 59.99'	130° 3.59'	53° 0'	129° 59.59'	73	124	98	9:28 am	7:32 pm
85	2126	18-Jul-10	52° 50'	130° 20.66'	52° 49.99'	130° 17.02'	112	123	117	5:31 am	12:26 pm
86	2123	18-Jul-10	52° 40'	130° 17.43'	52° 40'	130° 21.24'	95	130	112	7:18 am	3:55 pm
87	2124	18-Jul-10	52° 40'	130° 33.3'	52° 40'	130° 37.28'	78	82	80	8:53 am	7:08 pm
88	2114	19-Jul-10	52° 19.01'	130° 51.75'	52° 21.17'	130° 52.38'	77	84	80	5:02 am	10:58 am

Appendix B continued on next page.

Vessel PROUD VENTURE

Set	Station	Date	Start Lat	Start Lon	End Lat	End Lon	Min Depth (m)	Max Depth (m)	Avg. Depth (m)	End Deployment	Begin Retrieval
89	2120	19-Jul-10	52° 28.98'	130° 51.74'	52° 31.33'	130° 52.36'	56	61	58	6:39 am	2:16 pm
90	2119	19-Jul-10	52° 31.01'	130° 35.55'	52° 28.69'	130° 34.14'	66	75	70	8:37 am	6:10 pm
91	2099	20-Jul-10	51° 59.08'	130° 51.28'	52° 1.83'	130° 52.74'	97	108	102	5:01 am	10:58 am
92	2107	20-Jul-10	52° 9.12'	130° 51.67'	52° 11.28'	130° 52.48'	120	124	122	6:38 am	3:02 pm
93	2106	20-Jul-10	52° 11.58'	130° 35.6'	52° 9.49'	130° 34.7'	105	108	106	8:24 am	7:24 pm
94	2093	21-Jul-10	51° 49.99'	130° 53.84'	51° 49.99'	130° 50.37'	71	115	93	5:19 am	11:30 am
95	2092	21-Jul-10	51° 49.99'	130° 36.46'	51° 50.03'	130° 32.73'	150	164	157	6:57 am	5:25 pm
96	2098	21-Jul-10	51° 59.01'	130° 34.56'	52° 1.4'	130° 35.74'	131	157	144	8:37 am	11:29 pm
97	2091	22-Jul-10	51° 50.06'	130° 20.63'	51° 50'	130° 17.03'	115	120	117	6:05 am	1:23 pm
98	2088	22-Jul-10	51° 40.01'	130° 22.1'	51° 40'	130° 18.2'	137	149	143	8:42 am	6:09 pm
99	2087	22-Jul-10	51° 40.02'	130° 4.5'	51° 40.02'	130° 0.8'	194	199	196	10:26 am	10:16 pm
100	2105	23-Jul-10	52° 9.13'	130° 19.01'	52° 11.57'	130° 19'	220	252	236	5:09 am	12:02 pm
101	2112	23-Jul-10	52° 19.02'	130° 19.03'	52° 21.51'	130° 19.01'	185	198	191	6:29 am	4:11 pm
102	2113	23-Jul-10	52° 19'	130° 35.01'	52° 21.63'	130° 35.01'	88	94	91	8:35 am	8:15 pm
103	2116	24-Jul-10	52° 28.91'	129° 46.35'	52° 31.01'	129° 45.73'	90	107	98	5:01 am	11:03 am
104	2121	24-Jul-10	52° 39.14'	129° 45.48'	52° 41.13'	129° 46.6'	98	115	106	6:40 am	2:26 pm
105	2122	24-Jul-10	52° 40.99'	130° 2.49'	52° 38.82'	130° 1.46'	144	146	145	8:32 am	5:46 pm
106	2118	28-Jul-10	52° 30.94'	130° 19.33'	52° 28.54'	130° 18.64'	131	154	142	5:04 am	10:49 am
107	2117	28-Jul-10	52° 30.97'	130° 2.36'	52° 28.58'	130° 1.64'	144	152	148	6:56 am	2:14 pm
108	2111	28-Jul-10	52° 20.99'	130° 3.4'	52° 18.72'	130° 2.61'	115	137	126	8:20 am	5:38 pm
109	2110	29-Jul-10	52° 21.02'	129° 46.4'	52° 18.59'	129° 45.49'	115	119	117	5:02 am	11:59 am
110	2103	29-Jul-10	52° 11.94'	129° 46.82'	52° 9.51'	129° 45.91'	99	117	108	6:18 am	3:39 pm
111	2102	29-Jul-10	52° 11.03'	129° 30.29'	52° 8.52'	129° 29.59'	113	118	115	9:05 am	7:23 pm
112	2101	30-Jul-10	52° 11.75'	129° 14.57'	52° 9.33'	129° 13.9'	88	97	93	5:01 am	11:31 am
113	2085	30-Jul-10	52° 1.21'	129° 14.52'	51° 58.87'	129° 13.55'	98	99	98	6:31 am	3:11 pm
114	2094	30-Jul-10	51° 59.92'	129° 27.57'	52° 0.09'	129° 31.09'	114	118	116	8:29 am	6:49 pm
115	2097	31-Jul-10	52° 0.14'	130° 21.51'	51° 59.84'	130° 17.75'	190	220	205	5:02 am	11:06 am
116	2096	31-Jul-10	52° 0.1'	130° 5.04'	51° 59.88'	130° 1.46'	78	112	94	6:33 am	3:03 pm
117	2104	31-Jul-10	52° 9.85'	130° 0.92'	52° 10.14'	130° 4.47'	86	108	97	8:37 am	6:40 pm
118	2090	01-Aug-10	51° 48.88'	130° 1.68'	51° 51.31'	130° 3.29'	96	105	100	5:03 am	11:30 am
119	2089	01-Aug-10	51° 50.32'	129° 48.85'	51° 49.67'	129° 45.39'	124	152	138	6:50 am	3:24 pm
120	2095	01-Aug-10	52° 1.05'	129° 47.32'	51° 58.77'	129° 46.5'	62	64	63	9:08 am	7:03 pm
121	2081	02-Aug-10	51° 51.11'	129° 14.46'	51° 48.83'	129° 13.38'	67	68	67	5:01 am	12:09 pm
122	2082	02-Aug-10	51° 51.13'	129° 31.56'	51° 48.71'	129° 30.42'	132	142	137	7:39 am	4:00 pm
123	2076	02-Aug-10	51° 41.07'	129° 31.47'	51° 38.65'	129° 30.46'	50	57	53	9:00 am	7:51 pm
124	2064	03-Aug-10	51° 21.15'	129° 47.32'	51° 18.77'	129° 46.58'	129	135	132	5:03 am	12:18 pm
125	2063	03-Aug-10	51° 20.17'	129° 32.89'	51° 19.85'	129° 29.48'	109	117	113	7:02 am	4:13 pm
126	2070	03-Aug-10	51° 31.14'	129° 31.28'	51° 28.79'	129° 30.7'	52	64	58	9:40 am	7:33 pm

Appendix B continued on next page.

Vessel VANISLE

Set	Station	Date	Start Lat	Start Lon	End Lat	End Lon	Min Depth (m)	Max Depth (m)	Avg. Depth (m)	End Deployment	Begin Retrieval
97	2143	08-Aug-10	53° 19.82'	132° 47.35'	53° 20.34'	132° 51.07'	53	87	70	5:07 am	10:21 am
98	2144	08-Aug-10	53° 19.37'	133° 4.29'	53° 20.64'	133° 7.06'	117	143	130	6:29 am	1:40 pm
99	2146	08-Aug-10	53° 29.52'	133° 4.27'	53° 31.61'	133° 5.15'	112	210	161	7:56 am	5:17 pm
100	2149	09-Aug-10	53° 39.42'	133° 5.02'	53° 40.59'	133° 8.43'	76	82	79	5:14 am	12:08 pm
101	2151	09-Aug-10	54° 0.56'	133° 26.36'	53° 59.24'	133° 23.24'	37	46	41	8:26 am	5:02 pm
102	2168	10-Aug-10	54° 19.42'	133° 41.42'	54° 20.73'	133° 44.53'	132	138	135	5:02 am	10:38 am
103	2167	10-Aug-10	54° 20.39'	133° 28.01'	54° 19.68'	133° 24.67'	114	144	129	6:40 am	2:13 pm
104	2157	10-Aug-10	54° 9.65'	133° 24.5'	54° 10.65'	133° 27.86'	209	219	214	8:13 am	6:10 pm
105	2156	11-Aug-10	54° 8.94'	133° 8.48'	54° 10.64'	133° 9.73'	26	45	35	5:02 am	10:56 am
106	2166	11-Aug-10	54° 19.3'	133° 7.49'	54° 21.12'	133° 10.03'	250	254	252	6:32 am	2:28 pm
107	2165	11-Aug-10	54° 20.7'	132° 54.26'	54° 19.51'	132° 51.67'	208	226	217	8:06 am	6:44 pm
108	2155	12-Aug-10	54° 9.17'	132° 32.9'	54° 11.13'	132° 35.51'	41	55	48	5:03 am	10:21 am
109	2164	12-Aug-10	54° 19.37'	132° 33.66'	54° 20.98'	132° 36.89'	140	157	148	6:26 am	1:56 pm
110	2163	12-Aug-10	54° 20.5'	132° 19.86'	54° 19.71'	132° 16.75'	114	119	116	8:10 am	5:55 pm
111	2154	15-Aug-10	54° 9.47'	132° 14.99'	54° 10.45'	132° 18.56'	44	56	50	5:01 am	10:10 am
112	2153	15-Aug-10	54° 10.26'	132° 2.15'	54° 9.89'	131° 58.5'	41	42	41	6:36 am	1:03 pm
113	2162	15-Aug-10	54° 19.46'	131° 59.32'	54° 20.62'	132° 2.18'	134	144	139	8:01 am	4:18 pm
114	2161	16-Aug-10	54° 19.4'	131° 41.58'	54° 20.92'	131° 44.24'	98	114	106	5:23 am	10:39 am
115	2172	18-Jun-10	54° 29.45'	131° 42.91'	54° 30.82'	131° 45.48'	183	189	186	6:45 am	2:30 pm
116	2171	16-Aug-10	54° 28.98'	131° 26.99'	54° 30.87'	131° 24.94'	35	80	57	8:20 am	6:10 pm
117	2170	17-Aug-10	54° 30.39'	131° 10.78'	54° 29.51'	131° 6.9'	76	78	77	5:00 am	10:17 am
118	2160	17-Aug-10	54° 20.75'	131° 27.19'	54° 18.97'	131° 24.52'	77	105	91	7:11 am	2:10 pm
119	2159	17-Aug-10	54° 20.32'	131° 10.62'	54° 19.64'	131° 7.07'	35	44	39	8:26 am	5:11 pm
120	2158	18-Aug-10	54° 19.41'	130° 33.36'	54° 20.65'	130° 36.58'	37	70	53	5:02 am	10:48 am
121	2169	18-Aug-10	54° 29.43'	130° 33.37'	54° 30.44'	130° 36.87'	55	65	60	6:22 am	1:59 pm
122	2152	18-Aug-10	54° 11'	130° 36.35'	54° 9.14'	130° 34.1'	48	68	58	9:01 am	6:32 pm
123	2150	21-Aug-10	53° 50.2'	130° 53.6'	53° 49.74'	130° 49.76'	42	51	46	5:00 am	10:00 am
124	2148	21-Aug-10	53° 40.39'	130° 53.5'	53° 39.46'	130° 49.96'	22	26	24	6:28 am	1:18 pm
125	2147	21-Aug-10	53° 39.55'	130° 33.47'	53° 40.82'	130° 36.64'	17	40	28	8:01 am	4:26 pm
126	2145	22-Aug-10	53° 30.44'	130° 53.45'	53° 29.22'	130° 49.95'	49	56	52	5:03 am	10:37 am
127	2142	22-Aug-10	53° 20.62'	130° 53.41'	53° 19.02'	130° 50.35'	68	82	75	6:20 am	1:52 pm
128	2139	22-Aug-10	53° 10.66'	130° 53.6'	53° 9.33'	130° 50.59'	52	62	57	7:38 am	4:59 pm
129	2140	24-Aug-10	53° 19.7'	130° 16.37'	53° 20.37'	130° 20.1'	59	66	62	5:01 am	10:15 am
130	2141	24-Aug-10	53° 19.27'	130° 33.27'	53° 20.69'	130° 36.06'	17	74	45	6:22 am	1:58 pm
131	2138	24-Aug-10	53° 10.82'	130° 36.41'	53° 9.22'	130° 33.7'	101	104	102	7:59 am	5:29 pm
132	2137	25-Aug-10	53° 9.71'	130° 16.17'	53° 10.43'	130° 19.46'	67	97	82	5:00 am	10:23 am
133	2135	25-Aug-10	53° 0.56'	130° 19.55'	52° 59.02'	130° 16.52'	111	117	114	6:35 am	1:58 pm
134	2136	25-Aug-10	52° 59.48'	130° 32.91'	53° 0.53'	130° 36.08'	48	50	49	8:11 am	5:29 pm
135	2133	26-Aug-10	52° 50.57'	130° 36.97'	52° 49.34'	130° 33.48'	57	67	62	5:00 am	10:48 am
136	2134	26-Aug-10	52° 50.63'	130° 52.98'	52° 48.79'	130° 50.37'	25	33	29	6:59 am	2:21 pm
137	2131	26-Aug-10	52° 40.71'	130° 53.21'	52° 38.9'	130° 50.39'	47	55	51	8:11 am	5:37 pm
138	2132	27-Aug-10	52° 40.77'	131° 8.73'	52° 38.64'	131° 6.85'	35	44	39	5:07 am	10:11 am
139	2129	27-Aug-10	52° 30.87'	131° 9.09'	52° 28.89'	131° 6.76'	31	74	52	6:19 am	1:35 pm
140	2130	27-Aug-10	52° 29.68'	131° 23.16'	52° 30.27'	131° 26.62'	32	76	54	7:55 am	5:01 pm

Appendix C. Set information by PSFMC area, common IPHC station and year (2003 to 2010), showing number of hooks deployed, returned, with bait, empty, or with catch, separated for Halibut, North Pacific Spiny Dogfish, Redbanded Rockfish, Yelloweye Rockfish, Rougheye Rockfish, and Quillback Rockfish, with catch per 100 hooks shown for rockfish.

Hkd	# Hooks deployed	**No**	# other catch (fish/invert./inanimate)	**401**	# Redbanded Rockfish, catch per 100 Hooks
Hko	# Hooks observed/returned			**442**	# Yelloweye Rockfish, catch per 100 Hooks
Nb	# Hooks with bait left intact	**614**	# Pacific Halibut	**394**	# Rougheye Rockfish, catch per 100 Hooks
Ne	# Hooks empty/bait skin	**044**	#North Pacific Spiny Dogfish	**424**	# Quillback Rockfish, catch per 100 Hooks

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPUE	442	CPUE	394	CPUE	424	CPUE
3C/D, 5A																		
	2001	2003	5	800	800	0	479	30	9	282	0		0		0		0	
		2004	5	789	788	0	546	83	48	111	0		0		0		0	
		2005	5	694	688	0	154	3	0	533	0		0		0		0	
		2006	5	597	596	0	360	6	0	230	0		0		0		0	
		2007	2	501	501	0	291	0	6	204	0		0		0		0	
		2008	2	501	499	2	328	2	3	164	0		0		0		0	
		2009	3	686	684	23	338	17	65	240	0		1	0.15	0		0	
		2010	5	803	802	0	421	0	0	381	0		0		0		0	
	2002	2003	6	798	798	12	575	180	6	20	4	0.5	0		0		0	
		2004	6	788	779	46	495	183	19	1	15	1.93	0		20	2.57	0	
		2005	6	700	687	36	397	217	7	5	1	0.15	0		24	3.49	0	
		2006	4	500	483	3	315	46	6	113	0		0		0		0	
		2007	3	501	495	40	306	117	6	21	0		0		6	1.21	0	
		2008	4	504	498	12	295	117	13	60	1	0.2	0		0		0	
		2009	4	687	673	47	359	232	18	4	3	0.45	0		10	1.49	0	
		2010	8	792	786	1	505	188	16	63	10	1.27	0		3	0.38	0	
	2003	2003	3	796	796	0	606	12	3	175	0		0		0		0	
		2004	2	790	788	3	443	34	0	308	0		0		0		0	
		2005	3	700	699	1	518	8	1	164	0		0		0		0	
		2006	3	600	595	1	445	2	2	145	0		0		0		0	
		2007	1	494	494	0	372	3	0	119	0		0		0		0	
		2008	1	493	487	6	266	51	13	154	0		0		0		0	
		2009	1	696	691	5	448	13	3	224	0		0		0		0	
		2010	6	792	787	0	518	1	2	266	0		0		0		0	
	2004	2003	4	797	797	0	491	1	2	303	0		0		0		0	
		2004	4	796	796	0	326	4	4	462	0		0		0		0	
		2005	4	703	701	0	289	0	1	413	0		0		0		0	
		2006	6	602	601	0	392	2	36	172	0		0		0		0	
		2007	4	498	498	0	290	2	13	194	0		0		0		0	
		2008	3	499	496	74	176	35	60	151	0		0		0		0	
		2009	2	692	691	2	315	3	7	364	0		0		0		0	
		2010	4	789	788	0	496	2	5	285	0		0		0		0	
	2005	2003	8	785	785	4	409	6	12	327	0		27	3.44	0		0	
		2004	7	789	787	17	455	144	47	52	0		72	9.15	0		0	
		2005	7	707	706	0	463	9	2	222	0		10	1.42	0		0	
		2006	7	597	596	2	270	14	55	227	0		28	4.7	0		0	
		2007	5	497	497	4	280	10	13	175	0		15	3.02	0		0	
		2008	5	496	493	92	142	14	59	150	0		36	7.3	0		0	
		2009	5	688	683	10	360	16	30	220	0		48	7.03	0		0	
		2010	7	797	796	0	461	1	1	326	0		7	0.88	0		0	
	2006	2003	7	802	802	2	499	232	16	47	6	0.75	0		0		0	
		2004	8	796	788	213	395	152	23	5	0		0		0		0	
		2005	8	702	689	8	383	254	19	26	0		0		0		0	
		2006	8	604	596	1	407	17	7	164	0		0		0		0	
		2007	6	502	498	12	246	51	52	138	0		1	0.2	0		0	
		2008	6	495	489	2	290	11	9	177	0		1	0.2	0		0	
		2009	6	693	674	25	271	168	122	69	17	2.52	2	0.3	0		0	
		2010	9	795	788	1	368	149	92	178	4	0.51	0		0		0	
	2007	2003	1	795	795	6	430	9	7	322	0		7	0.88	0		14	1.76
		2004	3	793	789	4	383	5	3	387	0		5	0.63	0		2	0.25
		2005	1	689	686	60	464	21	63	6	0		18	2.62	0		54	7.87
		2006	1	601	600	87	396	40	29	14	0		3	0.5	0		31	5.17
		2007	9	494	494	135	246	24	26	50	0		1	0.2	0		13	2.63
		2008	11	492	490	114	254	24	18	67	0		8	1.63	0		5	1.02
		2009	9	693	689	139	338	21	28	139	0		3	0.44	0		21	3.05
		2010	1	783	781	158	538	27	16	10	0		11	1.41	0		21	2.69
	2008	2003	2	781	781	15	433	14	27	289	0		0		0		3	0.38
		2004	1	794	791	6	437	2	12	334	0		0		0		0	
		2005	2	690	688	28	391	37	106	65	0		9	1.31	0		52	7.56
		2006	2	600	599	27	443	10	61	45	0		2	0.33	0		11	1.84
		2007	10	500	500	0	396	0	1	102	0		1	0.2	0		0	
		2008	10	504	500	28	204	6	64	186	0		11	2.2	0		1	0.2

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(3C/D, 5A)																		
	2008	2009	8	699	672	2	300	0	13	354	0		2	0.3	0		1	0.15
		2010	2	783	770	70	520	12	148	9	0		3	0.39	0		8	1.04
	2009	2003	10	806	806	0	652	0	4	150	0		0		0		0	
		2004	11	795	789	1	314	3	1	470	0		0		0		0	
		2005	11	701	701	2	588	3	8	100	0		1	0.14	0		0	
		2006	11	602	601	0	428	3	3	168	0		0		0		0	
		2007	11	499	498	4	375	10	6	103	0		0		0		0	
		2008	9	488	490	57	258	21	9	145	0		0		0		0	
		2009	7	696	695	13	462	5	10	205	0		0		0		0	
		2010	3	780	769	2	544	5	5	213	0		0		0		0	
	2010	2003	11	792	792	6	374	1	13	398	0		0		0		0	
		2004	10	796	791	0	447	20	20	304	0		0		0		0	
		2005	10	703	700	14	463	18	76	129	0		0		0		0	
		2006	10	598	593	1	373	9	10	200	0		0		0		0	
		2007	8	498	498	2	365	4	24	103	0		0		0		0	
		2008	8	498	495	164	155	14	77	85	0		0		0		0	
		2009	22	702	696	24	355	6	26	285	0		0		0		0	
		2010	19	795	788	7	432	13	28	310	0		0		0		0	
	2011	2003	12	800	800	128	376	5	26	252	0		11	1.38	0		2	0.25
		2004	9	794	792	23	506	212	9	38	2	0.25	2	0.25	0		0	
		2005	9	703	699	0	489	35	1	175	0		0		0		0	
		2006	9	600	600	0	356	6	0	239	0		0		0		0	
		2007	7	502	501	2	270	22	10	198	0		0		0		0	
		2008	7	500	493	1	281	9	13	189	0		0		0		0	
		2009	25	703	696	40	338	60	34	223	1	0.14	0		0		0	
		2010	10	794	790	1	472	26	4	285	3	0.38	0		0		0	
	2012	2003	9	805	805	353	423	1	14	11	0		1	0.12	0		2	0.25
		2004	12	797	792	6	248	3	15	515	0		1	0.13	0		4	0.51
		2005	12	702	700	93	449	33	57	20	0		13	1.86	0		35	5
		2006	12	600	600	170	351	10	42	7	0		2	0.33	0		18	3
		2007	12	490	488	232	195	10	36	10	0		3	0.61	0		4	0.82
		2008	12	494	341	151	138	16	28	1	0		3	0.88	0		6	1.76
		2009	23	700	698	124	461	9	44	47	0		2	0.29	0		11	1.58
		2010	21	794	792	254	389	12	91	33	0		5	0.63	0		8	1.01
	2013	2003	14	803	803	0	490	0	3	310	0		0		0		0	
		2004	13	794	782	1	271	3	5	499	0		2	0.26	0		1	0.13
		2005	13	705	703	62	460	11	75	78	0		12	1.71	0		6	0.85
		2006	13	601	601	87	361	16	44	65	0		11	1.83	0		18	3
		2007	13	499	499	102	220	14	38	119	0		3	0.6	0		3	0.6
		2008	13	496	491	189	232	8	24	28	0		6	1.22	0		4	0.81
		2009	21	705	699	157	296	12	31	187	0		10	1.43	0		7	1
		2010	20	796	791	154	339	18	86	182	0		4	0.51	0		9	1.14
	2014	2003	13	803	803	0	408	2	1	392	0		0		0		0	
		2004	14	796	795	30	602	90	3	70	0		0		0		0	
		2005	14	703	701	4	460	2	2	233	0		0		0		0	
		2006	14	603	602	0	385	3	0	214	0		0		0		0	
		2007	14	502	500	0	273	0	0	227	0		0		0		0	
		2008	14	495	492	43	153	25	46	225	0		0		0		0	
		2009	24	702	696	13	378	10	9	286	0		0		0		0	
		2010	11	806	804	0	462	4	10	329	0		0		0		0	
	2015	2003	16	798	798	0	624	86	30	57	0		0		0		0	
		2004	15	787	785	53	578	143	5	0	5	0.64	1	0.13	0		0	
		2005	15	700	698	14	426	185	9	43	23	3.3	0		0		0	
		2006	19	597	597	3	444	53	3	89	5	0.84	0		0		0	
		2007	21	499	498	61	289	62	19	66	1	0.2	0		0		0	
		2008	22	497	493	12	263	29	15	174	1	0.2	0		0		0	
		2009	26	693	690	105	366	98	53	66	1	0.14	1	0.14	0		0	
		2010	12	797	796	3	496	146	37	114	1	0.13	3	0.38	0		0	
	2016	2003	15	804	804	6	541	34	11	212	0		0		0		0	
		2004	18	794	792	31	550	30	18	163	0		0		0		0	
		2005	17	702	702	12	382	24	21	260	0		0		0		4	0.57
		2006	15	600	597	58	272	43	23	196	0		1	0.17	0		5	0.84
		2007	15	500	498	16	243	20	8	209	0		0		0		2	0.4
		2008	15	493	488	187	210	25	23	43	0		0		0		0	
		2009	20	706	703	252	255	30	67	99	0		0		0		0	
		2010	18	800	795	8	388	48	76	277	0		0		0		0	
	2017	2003	17	806	806	2	389	6	10	399	0		0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(3C/D, 5A)																		
	2017	2004	17	789	789	91	515	146	1	36	0		0		0		0	
		2005	16	701	700	11	437	32	3	218	0		0		0		0	
		2006	21	599	598	0	445	13	7	134	0		0		0		0	
		2007	20	499	497	0	417	5	4	71	0		0		0		0	
		2008	20	498	496	6	319	28	5	138	0		0		0		0	
		2009	19	699	696	11	412	4	13	256	0		0		0		0	
		2010	17	804	803	0	395	39	17	359	0		0		0		0	
	2018	2003	19	798	798	9	604	128	17	32	2	0.25	0		4	0.5	0	
		2004	16	790	785	76	536	146	14	0	6	0.76	0		7	0.89	0	
		2005	18	703	700	118	442	109	23	4	3	0.43	0		1	0.14	0	
		2006	20	601	601	8	449	50	4	89	1	0.17	0		0		0	
		2007	19	491	490	5	329	12	9	134	1	0.2	0		0		0	
		2008	21	495	491	11	313	8	17	141	1	0.2	0		0		0	
		2009	18	699	682	47	375	120	86	45	10	1.47	0		0		0	
		2010	13	794	788	8	603	145	7	20	4	0.51	0		1	0.13	0	
	2019	2003	21	801	801	6	482	16	14	283	0		0		0		0	
		2004	26	795	793	25	606	29	3	130	0		0		0		0	
		2005	22	703	698	8	378	27	19	266	0		0		0		0	
		2006	23	601	601	1	386	11	4	199	0		0		0		0	
		2007	23	500	499	10	292	8	6	183	0		0		0		0	
		2008	16	496	493	307	127	15	21	23	0		0		0		0	
		2009	10	695	692	282	183	20	14	193	0		0		0		0	
		2010	16	795	792	27	358	27	39	342	0		0		0		0	
	2020	2003	18	805	805	3	402	4	15	381	0		0		0		0	
		2004	25	787	786	91	545	74	4	72	0		0		0		0	
		2005	19	705	705	1	420	2	1	282	0		0		0		0	
		2006	24	603	602	0	367	17	6	204	0		8	1.33	0		0	
		2007	24	501	501	0	292	3	0	206	0		0		0		0	
		2008	19	498	494	40	145	23	34	243	0		9	1.82	0		0	
		2009	13	692	683	67	306	41	39	227	0		3	0.44	0		0	
		2010	14	796	794	1	406	8	18	361	0		0		0		0	
	2021	2003	20	799	799	2	551	64	12	170	0		0		0		0	
		2004	24	793	792	473	256	27	36	0	0		0		0		0	
		2005	20	700	696	81	398	137	50	35	0		0		0		0	
		2006	16	598	598	1	458	30	6	103	0		0		0		0	
		2007	18	500	500	7	327	12	9	145	0		0		0		0	
		2008	23	494	494	0	327	0	0	167	0		0		0		0	
		2009	14	701	699	70	527	26	20	56	0		0		0		0	
		2010	15	790	788	0	549	45	13	184	0		0		0		0	
	2023	2003	22	797	797	92	400	16	1	288	0		0		0		0	
		2004	27	802	799	15	479	5	4	296	0		0		0		0	
		2005	21	701	701	163	296	112	23	107	0		0		0		0	
		2006	22	601	600	178	240	84	20	78	0		0		0		0	
		2007	22	499	498	249	130	18	25	76	0		0		0		0	
		2008	17	498	496	398	52	8	29	8	0		0		0		0	
		2009	11	696	688	427	162	32	37	30	0		0		0		0	
		2010	22	785	782	187	316	54	57	168	0		0		0		0	
	2024	2003	23	802	801	28	431	19	14	296	0		14	1.75	0		0	
		2004	28	802	789	45	447	31	37	193	0		32	4.06	0		4	0.51
		2005	23	701	329	43	183	21	27	35	0		16	4.86	0		5	1.52
		2006	25	598	593	75	280	68	32	96	0		36	6.07	0		8	1.35
		2007	25	501	484	40	257	28	12	114	0		30	6.2	0		3	0.62
		2008	18	493	488	234	153	33	31	2	0		34	6.97	0		3	0.61
		2009	12	681	669	204	266	46	54	63	0		31	4.63	0		5	0.75
		2010	23	710	696	29	344	36	117	123	0		38	5.46	0		12	1.72
	2025	2003	25	800	800	3	447	17	9	324	0		0		0		0	
		2004	23	804	804	40	554	165	21	24	0		0		0		0	
		2005	26	702	701	0	462	34	15	196	0		0		0		0	
		2006	17	603	603	0	426	23	2	152	0		0		0		0	
		2007	17	498	497	0	341	5	11	140	0		0		0		0	
		2008	25	499	499	1	297	1	1	199	0		0		0		0	
		2009	15	705	699	242	213	16	24	204	0		0		0		0	
		2010	26	798	796	0	363	5	6	423	0		0		0		0	
	2026	2003	27	807	807	63	449	125	12	157	0		1	0.12	0		0	
		2004	22	797	794	24	455	292	21	0	2	0.25	0		0		0	
		2005	27	703	702	1	395	232	23	50	2	0.28	3	0.43	0		0	
		2006	18	601	600	2	404	36	11	147	0		0		0		0	
		2007	16	495	492	1	354	13	9	113	4	0.81	0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(3C/D, 5A)																		
	2026	2008	24	502	493	0	263	15	14	199	2	0.41	0		0		0	
		2009	27	695	688	31	332	137	94	85	6	0.87	3	0.44	0		0	
		2010	27	796	790	0	419	86	24	264	0		0		0		0	
	2027	2003	24	804	804	36	340	10	2	412	0		0		0		4	0.5
		2004	30	794	789	14	434	12	5	323	0		1	0.13	0		0	
		2005	24	704	704	51	442	75	30	106	0		0		0		0	
		2006	26	597	596	125	314	67	17	74	0		0		0		0	
		2007	26	495	495	92	240	74	13	76	0		0		0		1	0.2
		2008	26	493	491	393	73	10	8	7	0		0		0		0	
		2009	17	690	683	228	358	39	47	10	0		0		0		1	0.15
		2010	24	797	788	47	521	58	106	48	0		2	0.25	0		6	0.76
	2028	2003	26	794	794	16	471	12	3	292	0		0		0		0	
		2004	29	796	794	73	529	21	17	153	0		1	0.13	0		0	
		2005	25	706	703	19	437	58	41	150	0		0		0		0	
		2006	27	602	601	7	285	64	34	211	0		0		0		0	
		2007	27	501	498	17	228	31	44	178	0		0		0		0	
		2008	27	497	486	184	159	49	43	51	0		0		0		0	
		2009	16	694	685	92	276	68	45	204	0		0		0		0	
		2010	25	799	793	25	310	37	11	410	0		0		0		0	
	2029	2003	28	798	798	3	442	21	16	316	0		0		0		0	
		2004	19	799	798	256	352	186	4	0	0		0		0		0	
		2005	28	702	702	3	471	41	2	192	0		0		0		0	
		2006	28	601	600	0	406	11	8	175	0		0		0		0	
		2007	28	501	498	8	308	19	26	137	0		0		0		0	
		2008	28	500	498	5	235	8	8	242	0		0		0		0	
		2009	28	710	706	13	367	40	75	212	0		0		0		0	
		2010	28	796	791	1	559	40	2	190	0		0		0		0	
	2030	2003	29	811	811	3	420	39	32	317	0		0		0		0	
		2004	20	793	793	58	553	153	29	0	0		0		0		0	
		2005	29	706	706	1	445	31	11	219	0		0		0		0	
		2006	29	599	599	2	424	11	7	155	0		0		0		0	
		2007	29	496	496	36	248	52	47	113	0		0		0		0	
		2008	29	496	494	127	189	34	36	108	0		0		0		0	
		2009	29	700	697	102	301	63	35	196	0		0		0		0	
		2010	29	795	794	1	348	16	27	403	0		0		0		0	
	2031	2003	30	791	791	13	435	101	16	214	9	1.14	0		3	0.38	0	
		2004	21	786	783	80	449	190	27	6	21	2.68	8	1.02	2	0.26	0	
		2005	30	700	699	16	363	206	55	46	16	2.29	0		1	0.14	0	
		2006	30	599	597	0	454	26	6	103	6	1.01	2	0.34	0		0	
		2007	30	497	496	6	291	31	14	141	10	2.02	2	0.4	1	0.2	0	
		2008	30	497	490	5	231	27	7	179	15	3.06	0		0		0	
		2009	30	688	678	12	320	109	155	72	3	0.44	8	1.18	0		0	
		2010	30	797	791	3	367	156	10	239	19	2.4	0		1	0.13	0	
	2032	2003	31	804	804	22	321	5	29	426	0		0		0		1	0.12
		2004	31	795	794	237	435	3	73	44	0		1	0.13	0		1	0.13
		2005	31	701	697	93	333	11	157	102	0		0		0		1	0.14
		2006	31	601	601	7	328	15	143	108	0		0		0		0	
		2007	31	499	498	43	308	4	100	43	0		0		0		0	
		2008	31	495	493	187	204	7	75	20	0		0		0		0	
		2009	31	697	696	21	253	12	90	320	0		0		0		0	
		2010	31	796	795	89	247	10	65	384	0		0		0		0	
	2033	2003	32	801	801	5	458	39	9	262	23	2.87	4	0.5	0		0	
		2004	32	799	794	33	563	175	6	1	14	1.76	0		2	0.25	0	
		2005	32	704	703	2	356	65	11	257	12	1.71	0		0		0	
		2006	32	599	599	4	408	10	2	165	0		10	1.67	0		0	
		2007	32	502	500	2	210	20	14	254	0		0		0		0	
		2008	32	495	490	1	208	14	12	251	0		4	0.82	0		0	
		2009	32	691	683	29	345	33	96	148	10	1.46	22	3.22	0		0	
		2010	32	797	794	0	304	10	5	461	0		14	1.76	0		0	
	2034	2003	33	788	788	16	345	21	68	335	0		1	0.13	0		2	0.25
		2004	33	798	796	121	575	19	66	10	0		3	0.38	0		2	0.25
		2005	33	705	704	47	460	15	114	51	0		11	1.56	0		6	0.85
		2006	33	602	602	25	368	31	94	81	0		3	0.5	0		0	
		2007	33	497	496	9	255	20	39	174	0		0		0		0	
		2008	33	498	496	86	250	26	93	34	0		4	0.81	0		3	0.6
		2009	33	701	675	10	390	30	92	152	0		1	0.15	0		0	
		2010	33	793	788	81	395	19	81	210	0		1	0.13	0		1	0.13

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(3C/D, 5A)																		
	2035	2003	34	802	802	11	524	52	11	183	3	0.37	18	2.24	0		0	
		2004	34	792	784	146	361	59	73	2	92	11.7	51	6.51	0		0	
		2005	34	699	699	9	368	53	41	211	9	1.29	10	1.43	0		0	
		2006	34	601	600	3	415	9	9	153	2	0.33	9	1.5	0		0	
		2007	34	499	498	50	218	20	39	140	11	2.21	20	4.02	0		0	
		2008	34	488	487	1	261	13	12	194	5	1.03	1	0.21	0		0	
		2009	34	695	693	108	284	54	64	82	59	8.51	42	6.06	0		0	
		2010	34	798	780	9	284	34	85	317	34	4.36	17	2.18	0		0	
	2037	2003	35	800	800	4	484	88	20	186	8	1	10	1.25	0		0	
		2004	35	793	789	83	444	208	18	2	11	1.39	23	2.92	0		0	
		2005	35	702	699	6	328	141	38	131	29	4.15	29	4.15	0		0	
		2006	35	602	597	1	404	21	13	132	21	3.52	6	1.01	0		0	
		2007	35	497	497	3	276	21	24	130	30	6.04	13	2.62	0		0	
		2008	35	488	486	0	301	4	5	170	5	1.03	2	0.41	0		0	
		2009	35	698	691	37	307	102	70	105	54	7.81	18	2.6	0		0	
		2010	35	799	787	3	356	48	109	187	66	8.39	21	2.67	0		0	
	2038	2003	36	800	800	230	472	10	43	41	0		3	0.38	0		1	0.12
		2004	82	794	791	22	635	28	104	2	0		0		0		0	
		2005	37	704	703	49	461	64	84	14	0		30	4.27	0		2	0.28
		2006	36	596	596	41	358	35	76	71	0		12	2.01	0		4	0.67
		2007	36	501	501	76	244	58	35	69	0		12	2.4	0		7	1.4
		2008	37	495	494	216	165	37	45	8	0		17	3.44	0		6	1.21
		2009	53	697	687	125	365	61	64	55	0		12	1.75	0		5	0.73
		2010	37	781	775	136	429	53	105	33	0		14	1.81	0		5	0.65
	2039	2003	37	792	792	6	536	27	7	201	9	1.14	6	0.76	0		0	
		2004	36	796	793	35	609	109	21	5	7	0.88	7	0.88	0		0	
		2005	38	703	703	9	434	46	14	173	20	2.84	10	1.42	0		0	
		2006	37	603	602	7	425	4	2	164	0		0		0		0	
		2007	69	500	499	0	325	5	2	166	1	0.2	1	0.2	0		0	
		2008	36	498	493	10	266	6	10	201	0		0		0		0	
		2009	54	697	695	17	363	23	20	258	6	0.86	8	1.15	0		0	
		2010	38	798	783	39	352	38	8	334	4	0.51	9	1.15	0		0	
	2040	2003	38	793	793	51	630	40	66	3	0		1	0.13	0		2	0.25
		2004	83	795	790	67	554	73	91	5	0		0		0		0	
		2005	36	702	702	35	486	61	102	9	0		6	0.85	0		3	0.43
		2006	40	599	597	100	360	40	91	2	0		1	0.17	0		3	0.5
		2007	68	496	495	79	302	54	47	6	0		1	0.2	0		7	1.41
		2008	38	494	489	91	318	40	36	3	0		1	0.2	0		0	
		2009	52	700	698	50	493	94	46	9	0		3	0.43	0		3	0.43
		2010	36	798	794	31	590	69	97	8	0		0		0		1	0.13
	2041	2003	53	800	800	24	616	87	69	3	0		0		1	0.12	0	
		2004	50	797	794	117	554	91	29	3	0		0		0		0	
		2005	78	701	700	59	516	85	36	4	0		0		0		0	
		2006	43	600	599	0	419	4	1	175	0		0		0		0	
		2007	37	500	500	61	332	43	53	11	0		0		0		0	
		2008	66	494	488	148	237	30	51	23	0		0		0		0	
		2009	47	699	696	174	430	57	26	9	0		0		0		0	
		2010	41	790	787	27	557	149	50	6	0		0		0		0	
	2042	2003	52	788	788	215	506	27	30	1	0		7	0.89	0		2	0.25
		2004	49	793	784	163	500	55	42	9	0		14	1.79	0		1	0.13
		2005	79	698	696	40	530	30	90	1	0		5	0.72	0		0	
		2006	42	603	603	36	458	57	27	21	0		4	0.66	0		0	
		2007	38	499	499	72	368	18	36	4	0		1	0.2	0		0	
		2008	65	499	495	82	340	15	40	11	0		3	0.61	0		4	0.81
		2009	46	698	698	108	365	124	56	27	0		14	2.01	0		6	0.86
		2010	39	796	788	20	566	113	74	2	0		11	1.4	0		3	0.38
	2043	2003	54	798	798	16	539	36	27	180	0		0		0		0	
		2004	51	801	799	85	558	61	31	64	0		0		0		0	
		2005	81	702	701	29	483	87	29	73	0		0		0		0	
		2006	45	601	600	6	390	52	17	140	0		0		0		0	
		2007	40	501	500	36	292	43	100	35	0		0		0		0	
		2008	63	496	490	33	276	34	65	82	1	0.2	0		0		0	
		2009	48	694	689	4	438	81	108	59	0		0		0		0	
		2010	40	789	782	21	474	182	32	75	1	0.13	0		0		0	
	2044	2003	41	797	797	164	481	24	57	16	0		45	5.65	0		10	1.25
		2004	80	792	789	81	514	47	70	0	0		72	9.13	0		5	0.63
		2005	40	705	699	72	492	24	81	1	0		29	4.15	0		0	
		2006	38	598	594	105	354	35	89	4	0		8	1.35	0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(3C/D, 5A)																		
	2044	2007	70	501	498	33	346	14	80	11	0		13	2.61	0		1	0.2
		2008	43	495	491	310	122	17	37	2	0		2	0.41	0		1	0.2
		2009	56	689	680	358	208	33	43	7	0		27	3.97	0		4	0.59
		2010	62	797	795	405	245	20	63	28	0		33	4.15	0		2	0.25
	2045	2003	42	610	610	276	243	8	72	7	0		4	0.66	0		0	
		2004	79	787	780	155	451	43	89	13	0		29	3.72	0		0	
		2005	39	703	700	116	389	15	143	3	0		34	4.86	0		0	
		2006	39	596	596	75	348	18	93	18	0		44	7.38	0		0	
		2007	82	494	492	19	252	24	83	79	0		35	7.11	0		0	
		2008	44	499	488	315	135	4	9	17	0		8	1.64	0		0	
		2009	55	694	685	157	290	26	100	57	0		55	8.03	0		0	
		2010	61	790	789	409	194	4	134	10	0		37	4.69	0		1	0.13
	2046	2003	51	801	801	155	578	34	30	0	0		2	0.25	0		2	0.25
		2004	84	791	789	43	670	14	62	0	0		0		0		0	
		2005	76	702	700	31	550	7	99	1	0		10	1.43	0		2	0.29
		2006	41	594	592	81	455	5	48	0	0		3	0.51	0		0	
		2007	67	501	500	74	355	3	61	7	0		0		0		0	
		2008	41	494	490	51	370	5	57	3	0		4	0.82	0		0	
		2009	51	701	701	216	363	30	82	11	0		0		0		0	
		2010	42	794	792	90	600	19	81	2	0		0		0		0	
	2047	2003	39	794	794	213	487	2	73	3	0		4	0.5	0		12	1.51
		2004	72	794	793	461	274	15	40	1	0		1	0.13	0		1	0.13
		2005	75	702	702	118	512	5	62	3	0		0		0		2	0.28
		2006	64	597	597	112	436	5	36	7	0		0		0		1	0.17
		2007	64	496	495	325	125	1	43	1	0		0		0		0	
		2008	39	496	494	333	125	1	34	0	0		1	0.2	0		0	
		2009	36	696	692	441	183	2	60	5	0		1	0.14	0		0	
		2010	45	794	793	306	402	10	66	3	0		2	0.25	0		4	0.5
	2048	2003	40	792	792	100	622	5	61	4	0		0		0		0	
		2004	81	789	787	93	627	7	60	0	0		0		0		0	
		2005	41	700	700	32	608	5	51	4	0		0		0		0	
		2006	61	600	600	115	455	8	19	3	0		0		0		0	
		2007	71	497	496	393	81	3	14	5	0		0		0		0	
		2008	42	491	488	324	135	11	16	2	0		0		0		0	
		2009	57	693	689	549	123	6	8	3	0		0		0		0	
		2010	63	790	787	234	452	7	90	4	0		0		0		0	
	2049	2003	43	801	801	213	506	24	51	7	0		0		0		0	
		2004	77	788	785	72	565	106	36	6	0		0		0		0	
		2005	42	703	702	24	544	99	27	8	0		1	0.14	0		0	
		2006	59	600	600	100	379	57	42	23	0		0		0		0	
		2007	72	500	499	212	220	27	12	27	0		1	0.2	0		0	
		2008	45	499	497	348	73	7	28	41	0		0		0		0	
		2009	58	704	698	143	454	16	49	36	0		0		0		0	
		2010	60	797	797	5	712	25	53	2	0		0		0		0	
	2050	2003	44	792	792	111	375	62	35	198	10	1.26	1	0.13	0		0	
		2004	76	790	781	221	324	91	54	12	64	8.19	15	1.92	0		0	
		2005	43	703	699	48	341	86	68	89	48	6.87	21	3	0		0	
		2006	60	594	593	10	331	45	10	122	50	8.43	26	4.38	0		0	
		2007	83	496	494	2	296	19	8	145	16	3.24	12	2.43	0		0	
		2008	53	500	489	55	156	81	41	105	48	9.82	5	1.02	0		0	
		2009	59	690	684	7	288	22	17	326	20	2.92	4	0.58	0		0	
		2010	59	797	791	45	352	134	65	91	69	8.72	36	4.55	0		0	
	2051	2003	55	796	796	11	519	8	34	214	0		9	1.13	1	0.13	0	
		2004	54	793	787	172	471	36	62	41	0		5	0.64	0		0	
		2005	80	704	702	23	455	60	66	70	0		29	4.13	0		0	
		2006	46	598	597	14	345	11	10	204	0		13	2.18	0		0	
		2007	39	491	483	219	202	4	26	13	0		18	3.73	0		1	0.21
		2008	64	498	498	220	196	7	31	36	0		9	1.81	0		0	
		2009	49	694	691	58	573	18	10	25	0		5	0.72	0		2	0.29
		2010	44	796	792	148	516	26	37	63	0		2	0.25	0		0	
	2052	2003	56	800	800	395	296	55	40	13	1	0.12	0		0		0	
		2004	53	795	793	209	515	32	20	14	3	0.38	0		0		0	
		2005	77	701	699	195	446	23	23	2	10	1.43	0		0		0	
		2006	47	598	598	5	452	8	2	130	1	0.17	0		0		0	
		2007	66	501	501	184	241	16	9	45	6	1.2	0		0		0	
		2008	40	492	483	22	280	72	43	65	1	0.21	0		0		0	
		2009	50	693	681	14	478	64	45	79	2	0.29	0		0		0	
		2010	43	794	787	0	602	18	16	149	2	0.25	0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(3C/D, 5A)																		
	2053	2003	57	798	798	557	187	0	54	0	0		0		0		0	
		2004	71	795	792	254	411	18	109	0	0		0		0		0	
		2005	74	701	699	66	521	9	103	0	0		0		0		0	
		2006	63	600	599	19	473	10	96	1	0		0		0		0	
		2007	65	498	498	167	266	6	57	2	0		0		0		0	
		2008	47	493	490	191	208	5	79	7	0		0		0		0	
		2009	38	700	695	35	483	36	129	12	0		0		0		0	
		2010	48	793	792	316	334	38	103	1	0		0		0		0	
	2054	2003	63	801	801	138	570	8	81	4	0		0		0		0	
		2004	70	794	793	336	325	78	52	2	0		0		0		0	
		2005	73	704	704	101	500	17	79	7	0		0		0		0	
		2006	62	599	599	42	454	29	70	4	0		0		0		0	
		2007	74	498	498	33	327	15	117	6	0		0		0		0	
		2008	46	504	501	149	250	10	80	13	0		1	0.2	0		0	
		2009	37	695	690	23	478	24	141	24	0		0		0		0	
		2010	56	794	792	254	422	25	83	8	0		0		0		0	
	2055	2003	45	800	800	148	401	140	64	19	21	2.62	0		7	0.88	0	
		2004	78	795	789	188	457	85	36	4	12	1.52	0		7	0.89	0	
		2005	45	703	702	12	402	216	43	11	14	1.99	0		5	0.71	0	
		2006	58	597	595	16	397	146	22	12	2	0.34	0		0		0	
		2007	73	500	498	15	348	70	17	43	4	0.8	0		1	0.2	0	
		2008	51	493	493	34	291	93	54	13	5	1.01	0		3	0.61	0	
		2009	60	697	685	19	377	172	65	38	12	1.75	0		2	0.29	0	
		2010	57	798	794	0	546	115	96	30	7	0.88	0		2	0.25	0	
	2056	2003	46	798	798	78	538	125	18	39	0		0		0		0	
		2004	75	795	780	319	336	59	49	10	6	0.77	0		1	0.13	0	
		2005	44	702	701	6	420	134	54	86	3	0.43	0		0		0	
		2006	57	601	600	49	391	107	8	43	2	0.33	0		0		0	
		2007	84	502	500	1	338	31	6	124	0		0		0		0	
		2008	52	500	491	61	221	88	89	31	1	0.2	0		0		0	
		2009	61	463	447	4	269	55	30	90	0		0		0		0	
		2010	58	790	786	13	464	92	152	64	2	0.25	0		0		0	
	2058	2003	76	803	803	82	641	23	39	18	0		0		0		0	
		2007	42	498	497	152	291	11	26	17	0		0		0		0	
		2010	65	795	791	28	603	28	96	24	0		10	1.26	0		2	0.25
5B																		
	2057	2003	74	803	803	152	488	32	73	53	0		3	0.37	0		2	0.25
		2004	39	800	795	104	551	45	29	50	0		16	2.01	0		0	
		2005	84	695	695	71	536	23	7	56	0		2	0.29	0		0	
		2006	44	603	602	32	400	16	13	132	0		5	0.83	0		4	0.66
		2007	41	501	500	58	356	15	25	41	0		5	1	0		0	
		2008	62	498	495	18	378	10	25	59	0		5	1.01	0		0	
		2009	45	689	681	13	477	40	44	107	0		1	0.15	0		0	
		2010	64	794	789	65	497	105	50	47	0		21	2.66	0		4	0.51
	2058	2004	37	798	796	122	584	37	44	9	0		0		0		0	
		2005	83	701	700	48	594	13	36	10	0		0		0		0	
		2006	48	601	601	80	479	15	23	4	0		0		0		0	
		2008	61	501	499	252	174	16	41	16	0		0		0		0	
		2009	43	699	695	244	374	31	31	15	0		0		0		0	
	2059	2003	77	801	801	485	269	18	12	13	1	0.12	3	0.37	0		0	
		2004	52	799	796	115	533	78	17	25	28	3.52	0		0		0	
		2005	70	701	700	99	471	69	11	47	5	0.71	0		0		0	
		2006	83	597	597	203	318	48	18	8	2	0.34	0		0		0	
		2007	43	498	497	89	320	43	19	26	0		0		0		0	
		2008	59	499	497	46	363	5	32	51	0		0		0		0	
		2009	42	692	689	49	523	14	24	79	0		0		0		0	
		2010	46	796	795	89	576	81	22	27	0		0		0		0	
	2060	2003	58	794	794	60	493	114	55	70	1	0.13	1	0.13	0		0	
		2004	55	798	790	136	486	95	35	10	28	3.54	0		0		0	
		2005	71	700	698	61	475	95	27	13	28	4.01	0		0		0	
		2006	84	597	595	111	386	69	12	6	11	1.85	0		0		0	
		2007	62	500	498	2	391	31	24	47	3	0.6	0		0		0	
		2008	48	488	481	33	271	56	49	70	1	0.21	1	0.21	0		0	
		2009	39	698	687	6	408	16	11	245	2	0.29	0		0		0	
		2010	47	796	792	3	580	52	50	88	19	2.4	0		0		0	
	2061	2003	62	801	801	66	597	90	27	2	18	2.25	0		1	0.12	0	
		2004	68	793	791	269	411	42	25	3	29	3.67	0		12	1.52	0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5B)																		
	2061	2005	72	703	702	78	448	115	26	1	33	4.7	0		1	0.14	0	
		2006	52	605	604	63	432	71	12	10	16	2.65	0		0		0	
		2007	63	504	497	5	354	104	22	3	11	2.21	0		1	0.2	0	
		2008	49	498	495	5	307	131	30	17	9	1.82	0		0		0	
		2009	67	697	683	39	413	118	76	27	10	1.46	0		0		0	
		2010	55	792	782	50	603	73	32	7	16	2.05	0		1	0.13	0	
	2062	2003	64	803	803	101	653	28	16	2	2	0.25	0		1	0.12	0	
		2004	69	794	789	144	495	42	56	2	29	3.68	0		21	2.66	0	
		2005	54	701	701	19	530	77	60	4	11	1.57	0		0		0	
		2006	56	602	599	37	451	46	39	15	9	1.5	0		2	0.33	0	
		2007	76	501	499	1	348	80	27	39	3	0.6	0		1	0.2	0	
		2008	50	499	497	22	254	92	89	30	9	1.81	0		1	0.2	0	
		2009	66	689	681	16	408	111	54	59	33	4.85	0		0		0	
		2010	51	795	791	0	666	60	31	30	5	0.63	0		0		0	
	2063	2003	47	798	798	101	510	44	69	54	14	1.75	6	0.75	0		0	
		2004	74	794	790	224	386	75	84	9	11	1.39	1	0.13	0		0	
		2005	53	704	704	18	521	67	33	60	3	0.43	2	0.28	0		0	
		2006	55	598	597	72	392	51	28	51	1	0.17	2	0.34	0		0	
		2007	77	499	497	2	349	44	16	85	1	0.2	0		0		0	
		2008	67	499	493	55	227	68	7	130	5	1.01	1	0.2	0		0	
		2009	62	697	692	61	346	41	58	174	11	1.59	1	0.14	0		0	
		2010	125	796	785	26	587	67	35	49	16	2.04	5	0.64	0		0	
	2064	2003	48	795	795	57	571	80	23	57	7	0.88	0		0		0	
		2004	73	797	794	172	435	125	48	1	12	1.51	1	0.13	0		0	
		2005	46	703	702	20	466	130	13	66	8	1.14	0		0		0	
		2006	65	600	600	24	399	101	7	61	8	1.33	0		0		0	
		2007	81	501	500	4	331	69	4	85	7	1.4	0		0		0	
		2008	70	500	496	5	307	80	10	93	1	0.2	0		0		0	
		2009	126	702	695	5	269	7	13	392	8	1.15	1	0.14	0		0	
		2010	124	794	784	56	579	91	18	35	8	1.02	0		0		0	
	2065	2003	75	799	799	228	466	6	65	21	0		10	1.25	0		3	0.38
		2004	38	798	795	145	488	21	56	32	0		48	6.04	0		5	0.63
		2005	82	701	701	90	417	27	22	67	0		60	8.56	0		18	2.57
		2006	49	595	590	74	329	20	45	57	0		57	9.66	0		9	1.53
		2007	44	493	489	24	380	11	25	20	0		27	5.52	0		4	0.82
		2008	60	496	492	170	195	15	31	25	0		50	10.1	0		7	1.42
		2009	44	698	694	62	462	25	79	22	0		33	4.76	0		12	1.73
		2010	66	794	791	54	521	24	77	33	0		73	9.23	0		9	1.14
	2066	2003	78	806	806	388	373	27	1	14	3	0.37	0		0		0	
		2004	57	803	799	97	550	73	0	51	25	3.13	0		3	0.38	0	
		2005	69	704	701	69	531	77	3	5	15	2.14	0		1	0.14	0	
		2006	82	599	599	106	397	64	8	3	17	2.84	0		4	0.67	0	
		2007	45	498	496	35	372	33	18	34	3	0.6	0		1	0.2	0	
		2008	58	500	494	169	223	58	23	17	3	0.61	0		1	0.2	0	
		2009	41	710	698	3	579	50	32	30	4	0.57	0		0		0	
		2010	68	799	795	5	598	163	9	14	3	0.38	0		3	0.38	0	
	2067	2003	59	801	801	122	508	8	11	152	0		0		0		0	
		2004	56	795	793	70	576	15	20	112	0		0		0		0	
		2005	68	702	702	62	445	27	23	145	0		0		0		0	
		2006	50	602	602	34	406	13	7	143	0		0		0		0	
		2007	61	497	497	8	364	10	7	108	0		0		0		0	
		2008	57	492	491	24	332	6	13	116	0		0		0		0	
		2009	40	697	688	30	416	45	32	165	0		0		0		0	
		2010	69	795	790	6	715	31	21	17	0		0		0		0	
	2068	2003	61	794	794	283	374	8	13	114	0		2	0.25	0		0	
		2004	67	796	796	132	371	30	28	234	0		1	0.13	0		0	
		2005	67	705	705	99	315	36	36	216	0		3	0.43	0		0	
		2006	51	598	598	113	310	19	16	140	0		0		0		0	
		2007	60	493	493	137	219	30	26	82	0		0		0		0	
		2008	72	499	498	235	141	8	38	76	0		0		0		0	
		2009	65	699	683	34	381	9	51	208	0		0		0		0	
		2010	49	791	789	313	254	24	117	82	0		0		0		0	
	2069	2003	65	802	802	1	453	1	3	343	0		1	0.12	0		0	
		2004	66	798	791	5	486	1	16	282	0		1	0.13	0		0	
		2005	66	701	699	23	355	15	29	269	0		11	1.57	0		0	
		2006	53	599	588	41	367	10	39	127	0		4	0.68	0		0	
		2007	75	498	497	9	312	10	28	132	0		6	1.21	0		0	
		2008	71	497	492	18	242	8	137	82	0		7	1.42	0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5B)																		
	2069	2009	64	702	689	75	368	16	133	73	0		24	3.48	0		1	0.15
		2010	50	790	779	25	283	8	48	100	0		17	2.18	0		0	
	2070	2003	66	799	799	30	472	24	191	11	0		69	8.64	0		2	0.25
		2004	65	792	783	47	479	17	129	0	0		111	14.1	0		0	
		2005	52	700	700	42	418	20	128	22	0		70	10	0		0	
		2006	54	600	587	51	404	9	58	50	0		17	2.9	0		0	
		2007	78	497	496	2	320	3	21	111	0		39	7.86	0		1	0.2
		2008	68	493	490	5	230	5	102	77	0		73	14.9	0		0	
		2009	63	697	689	23	375	12	109	67	0		103	14.9	0		0	
		2010	126	798	789	11	415	2	254	17	0		90	11.4	0		0	
	2071	2003	49	791	791	69	386	67	65	138	8	1.01	58	7.33	0		0	
		2004	62	797	790	142	327	70	109	1	7	0.89	134	16.9	0		0	
		2005	48	701	699	17	365	69	43	116	6	0.86	83	11.8	0		0	
		2006	67	599	596	3	345	40	58	76	7	1.17	67	11.2	0		0	
		2007	79	497	494	3	291	36	26	77	3	0.61	58	11.7	0		0	
		2008	69	496	493	153	130	62	38	28	5	1.01	77	15.6	0		0	
		2009	125	693	689	2	244	36	46	271	5	0.73	85	12.3	0		0	
		2010	53	789	778	4	365	31	108	171	0		99	12.7	0		0	
	2072	2003	50	793	793	94	488	129	19	23	20	2.52	1	0.13	19	2.4	0	
		2004	63	796	786	148	408	157	30	1	29	3.69	0		13	1.65	0	
		2005	47	703	696	103	411	71	30	48	28	4.02	0		5	0.72	0	
		2006	66	600	600	41	341	76	22	106	15	2.5	0		0		0	
		2007	80	501	501	6	328	78	11	68	9	1.8	0		0		0	
		2008	56	494	482	22	329	79	9	17	26	5.39	0		0		0	
		2009	124	696	681	84	316	114	31	103	33	4.85	0		1	0.15	0	
		2010	54	794	793	0	472	54	19	230	13	1.64	0		5	0.63	0	
	2073	2003	80	804	804	497	283	12	8	4	0		0		0		0	
		2004	40	799	798	437	277	28	19	32	4	0.5	1	0.13	0		0	
		2005	55	701	696	151	418	73	16	23	11	1.58	4	0.57	0		0	
		2006	81	596	595	42	401	84	49	19	0		0		0		0	
		2007	46	503	501	5	416	22	31	23	2	0.4	2	0.4	0		0	
		2008	79	500	492	196	146	38	102	8	2	0.41	0		0		0	
		2009	68	698	690	89	413	91	32	50	16	2.32	0		0		0	
		2010	67	795	795	215	357	99	45	73	1	0.13	5	0.63	0		0	
	2074	2003	60	800	800	18	515	0	24	243	0		0		0		0	
		2004	59	791	791	32	415	7	20	317	0		0		0		0	
		2005	64	703	702	0	425	0	2	275	0		0		0		0	
		2006	78	598	598	6	406	2	14	171	0		0		0		0	
		2007	58	501	500	38	310	9	33	110	0		0		0		0	
		2008	73	498	496	108	207	2	20	159	0		0		0		0	
		2009	85	693	678	0	299	1	33	345	0		0		0		0	
		2010	71	796	790	5	468	6	31	280	0		0		0		0	
	2075	2003	67	798	798	4	572	8	26	188	0		0		0		0	
		2004	60	800	800	86	482	97	41	94	0		0		0		0	
		2005	65	701	700	0	422	0	2	276	0		0		0		0	
		2006	77	597	597	56	375	9	37	120	0		0		0		0	
		2007	59	502	501	188	214	17	31	51	0		0		0		0	
		2008	74	492	490	4	277	4	43	162	0		0		0		0	
		2009	81	698	690	7	338	0	50	295	0		0		0		0	
		2010	72	797	797	0	489	4	36	269	0		0		0		0	
	2076	2003	68	799	799	486	221	4	61	26	0		1	0.13	0		0	
		2004	64	789	786	175	408	51	102	50	0		0		0		0	
		2005	49	702	701	123	437	5	51	84	0		1	0.14	0		0	
		2006	68	600	598	1	428	3	8	158	0		0		0		0	
		2007	53	502	502	1	336	0	41	124	0		0		0		0	
		2008	54	499	499	3	277	1	9	209	0		0		0		0	
		2009	82	688	683	2	369	4	93	208	0		6	0.88	0		1	0.15
		2010	123	793	786	296	302	9	79	100	0		0		0		0	
	2077	2003	69	795	795	103	527	80	31	35	14	1.76	5	0.63	0		0	
		2004	61	796	773	132	457	124	31	0	9	1.16	11	1.42	9	1.16	0	
		2005	51	701	700	23	493	94	11	70	7	1	0		2	0.29	0	
		2006	69	596	595	9	454	85	2	36	5	0.84	0		5	0.84	0	
		2007	52	496	492	138	275	55	8	8	6	1.22	0		2	0.41	0	
		2008	55	499	494	30	302	87	34	6	21	4.25	3	0.61	11	2.23	0	
		2009	86	691	682	58	438	70	22	77	17	2.49	0		0		0	
		2010	52	797	794	1	566	112	27	67	15	1.89	4	0.5	3	0.38	0	
	2078	2003	79	801	801	68	668	26	35	4	0		0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5B)																		
	2078	2004	42	798	792	134	605	33	11	4	2	0.25	2	0.25	1	0.13	0	
		2005	56	702	701	23	529	62	40	10	5	0.71	15	2.14	0		18	2.57
		2006	79	602	600	40	469	46	25	1	17	2.83	0		0		3	0.5
		2007	47	497	497	13	414	24	20	6	11	2.21	4	0.8	0		5	1.01
		2008	78	495	485	87	253	38	79	8	15	3.09	5	1.03	0		0	
		2009	69	680	670	10	492	57	54	15	40	5.97	2	0.3	0		0	
		2010	73	795	784	50	629	55	33	3	13	1.66	1	0.13	0		0	
	2079	2003	81	802	802	33	600	18	120	31	0		0		0		0	
		2004	41	797	795	127	563	12	88	5	0		0		0		0	
		2005	57	702	702	31	419	83	146	24	0		0		0		0	
		2006	80	600	599	47	383	26	133	12	0		0		0		0	
		2007	56	494	493	1	349	13	98	32	0		0		0		0	
		2008	80	500	494	80	241	22	144	10	0		0		0		0	
		2009	70	699	695	7	402	15	245	26	0		0		0		0	
		2010	74	796	792	50	545	47	123	27	0		0		0		0	
	2080	2003	73	795	795	95	460	2	30	163	0		42	5.28	0		3	0.38
		2004	58	795	788	293	347	12	66	43	0		26	3.3	0		1	0.13
		2005	61	701	699	162	326	4	48	147	0		10	1.43	0		2	0.29
		2006	75	598	598	21	407	15	110	32	0		12	2.01	0		1	0.17
		2007	57	495	491	49	303	14	30	86	0		9	1.83	0		2	0.41
		2008	81	495	492	22	274	4	119	59	0		11	2.24	0		3	0.61
		2009	83	692	685	49	322	6	120	168	0		15	2.19	0		5	0.73
		2010	70	791	787	66	454	8	35	196	0		21	2.67	0		7	0.89
	2081	2003	71	800	800	424	247	4	36	89	0		0		0		0	
		2004	47	800	798	12	534	19	52	181	0		0		0		0	
		2005	63	700	700	63	459	9	48	121	0		0		0		0	
		2006	76	603	603	62	426	30	39	46	0		0		0		0	
		2007	55	499	499	4	353	8	54	80	0		0		0		0	
		2008	77	499	496	4	313	3	36	140	0		0		0		0	
		2009	84	690	678	73	429	6	41	129	0		0		0		0	
		2010	121	795	791	14	527	13	48	189	0		0		0		0	
	2082	2003	70	800	800	4	711	48	22	1	12	1.5	0		2	0.25	0	
		2004	48	793	787	66	585	45	25	4	34	4.32	0		28	3.56	0	
		2005	50	703	697	68	514	54	11	26	20	2.87	0		4	0.57	0	
		2006	70	603	603	21	493	55	9	10	15	2.49	0		1	0.17	0	
		2007	54	499	499	43	345	48	17	33	13	2.61	0		0		0	
		2008	75	493	490	105	235	83	16	12	20	4.08	0		19	3.88	0	
		2009	80	702	688	0	514	68	43	39	22	3.2	0		3	0.44	0	
		2010	122	797	794	12	652	66	5	21	26	3.27	0		12	1.51	0	
	2083	2003	82	800	800	70	509	98	50	57	16	2	0		0		0	
		2004	44	795	787	130	523	92	10	11	20	2.54	1	0.13	0		0	
		2005	58	702	701	99	425	129	8	17	23	3.28	0		0		0	
		2006	72	597	597	44	405	58	21	26	43	7.2	0		0		0	
		2007	49	499	497	45	380	14	23	25	10	2.01	0		0		0	
		2008	83	499	498	93	214	19	45	12	115	23.0	0		0		0	
		2009	75	699	686	5	537	21	33	17	73	10.6	2	0.29	0		0	
		2010	75	797	790	52	589	31	13	92	13	1.65	0		0		0	
	2084	2003	84	805	805	228	443	13	77	41	0		3	0.37	0		0	
		2004	43	798	789	216	411	72	73	4	0		13	1.65	0		0	
		2005	60	702	702	20	465	62	77	74	0		4	0.57	0		0	
		2006	73	595	592	50	403	24	105	8	0		2	0.34	0		0	
		2007	50	501	500	31	323	47	72	21	0		6	1.2	0		0	
		2008	82	498	493	146	180	38	77	43	0		9	1.83	0		0	
		2009	76	694	683	65	410	14	87	105	0		2	0.29	0		0	
		2010	76	793	792	32	521	33	79	124	0		3	0.38	0		0	
	2085	2003	72	801	801	284	487	5	5	19	1	0.12	0		0		0	
		2004	46	798	797	350	344	22	26	33	22	2.76	0		0		0	
		2005	62	703	702	23	628	13	7	25	7	1	0		0		0	
		2006	74	604	603	17	494	25	14	53	0		0		0		0	
		2007	51	502	502	55	392	6	16	33	0		0		0		0	
		2008	76	502	490	155	267	7	11	38	12	2.45	0		0		0	
		2009	71	697	690	34	574	30	5	17	30	4.35	0		0		0	
		2010	113	798	794	131	521	44	33	64	1	0.13	0		0		0	
	2086	2003	83	803	803	489	262	18	20	5	9	1.12	0		0		0	
		2004	45	800	791	197	483	22	15	2	68	8.6	4	0.51	0		0	
		2008	84	500	496	107	220	58	41	17	49	9.88	3	0.6	1	0.2	0	
		2010	78	796	787	179	512	44	10	28	9	1.14	3	0.38	2	0.25	0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5B)																		
	2087	2003	3	795	795	6	639	114	7	4	12	1.51	0		13	1.64	0	
		2004	41	792	790	4	523	137	10	0	27	3.42	1	0.13	88	11.1	0	
		2005	33	699	690	27	448	156	8	16	11	1.59	0		25	3.62	0	
		2006	12	595	571	10	394	128	19	20	2	0.35	0		1	0.18	0	
		2007	17	482	473	1	354	93	5	19	0		0		3	0.63	0	
		2008	3	488	488	34	302	103	4	2	19	3.89	0		24	4.92	0	
		2009	87	690	676	10	440	163	21	36	7	1.04	0		1	0.15	0	
		2010	99	792	791	2	632	102	10	23	15	1.9	0		7	0.88	0	
	2088	2003	4	784	784	267	366	99	7	6	39	4.97	0		0		0	
		2004	42	797	794	77	497	82	108	2	27	3.4	0		1	0.13	0	
		2005	31	696	693	173	291	96	15	42	76	10.9	0		0		0	
		2006	13	598	583	40	309	39	17	113	65	11.1	1	0.17	0		0	
		2007	16	485	483	1	355	39	10	70	9	1.86	0		0		0	
		2008	4	490	487	131	223	52	44	21	15	3.08	0		1	0.21	0	
		2009	123	694	678	88	251	86	48	164	41	6.05	0		1	0.15	0	
		2010	98	792	782	69	520	76	40	57	21	2.69	0		0		0	
	2089	2003	1	793	793	47	660	45	29	4	4	0.5	0		4	0.5	0	
		2004	10	803	800	121	548	64	16	36	14	1.75	0		1	0.12	0	
		2005	35	692	688	165	385	42	16	53	24	3.49	2	0.29	1	0.15	0	
		2006	10	585	580	21	314	6	53	185	0		1	0.17	0		0	
		2007	10	493	489	2	368	24	24	57	14	2.86	0		0		0	
		2008	15	503	501	221	220	33	6	1	19	3.79	0		1	0.2	0	
		2009	88	694	686	0	545	40	17	69	6	0.87	0		9	1.31	0	
		2010	119	795	792	21	688	44	13	18	6	0.76	0		2	0.25	0	
	2090	2003	2	786	786	108	399	70	109	41	7	0.89	52	6.62	0		0	
		2004	40	804	800	97	426	83	98	2	27	3.38	67	8.38	0		0	
		2005	34	701	694	135	296	82	41	101	3	0.43	36	5.19	0		0	
		2006	11	566	550	22	258	30	55	119	13	2.36	53	9.64	0		0	
		2007	18	492	485	0	320	23	43	90	1	0.21	8	1.65	0		0	
		2008	2	494	491	148	182	41	69	23	7	1.43	21	4.28	0		0	
		2009	90	696	691	4	318	53	48	175	4	0.58	90	13.0	0		0	
		2010	118	794	790	175	255	85	102	45	20	2.53	108	13.6	0		0	
	2091	2003	5	788	788	253	276	40	160	18	9	1.14	32	4.06	0		0	
		2004	39	805	798	39	503	56	109	5	47	5.89	39	4.89	0		0	
		2005	32	694	688	101	255	48	128	76	34	4.94	46	6.69	0		0	
		2006	14	590	582	11	270	34	67	166	16	2.75	20	3.44	0		0	
		2007	15	488	478	0	292	7	13	137	7	1.46	22	4.6	0		0	
		2008	1	477	476	181	170	33	29	21	19	3.99	24	5.04	0		0	
		2009	122	691	684	31	230	52	68	238	19	2.78	47	6.87	0		0	
		2010	97	797	790	3	405	38	111	172	17	2.15	46	5.82	0		0	
	2092	2003	6	788	788	72	533	48	104	16	2	0.25	0		13	1.65	0	
		2004	35	799	141	10	74	30	18	0	0		0		9	6.38	0	
		2005	30	699	693	198	267	87	102	38	1	0.14	0		0		0	
		2006	15	589	433	16	209	18	92	98	2	0.46	0		0		0	
		2007	12	481	479	0	285	69	66	54	1	0.21	0		4	0.84	0	
		2008	6	496	489	80	284	63	50	5	1	0.2	0		6	1.23	0	
		2009	121	692	679	71	315	163	36	84	6	0.88	0		4	0.59	0	
		2010	95	795	786	18	478	140	120	27	4	0.51	0		2	0.25	0	
	2093	2003	7	789	789	30	405	36	68	21	47	5.96	182	23.0	0		0	
		2004	34	795	791	20	541	18	125	0	16	2.02	71	8.98	0		0	
		2005	29	657	649	68	317	28	59	66	26	4.01	87	13.4	0		0	
		2006	16	600	584	10	264	21	48	146	10	1.71	86	14.7	0		0	
		2007	11	495	484	0	220	9	4	194	6	1.24	53	10.9	0		0	
		2008	7	490	479	14	243	33	81	3	17	3.55	89	18.5	0		0	
		2009	120	546	531	30	253	20	41	69	27	5.08	93	17.5	0		0	
		2010	94	796	788	0	390	39	62	24	37	4.7	236	29.9	0		0	
	2094	2003	78	795	795	228	430	53	46	3	21	2.64	14	1.76	0		0	
		2004	12	800	796	88	415	114	38	29	87	10.9	25	3.14	0		0	
		2005	37	700	698	149	307	66	12	130	25	3.58	9	1.29	0		0	
		2006	9	593	585	53	266	121	37	51	51	8.72	6	1.03	0		0	
		2007	9	489	480	36	244	74	21	70	28	5.83	7	1.46	0		0	
		2008	16	495	493	203	178	54	14	19	18	3.65	8	1.62	0		0	
		2009	79	701	681	0	421	90	25	84	37	5.43	24	3.52	0		0	
		2010	114	796	786	62	502	82	54	52	30	3.82	4	0.51	0		0	
	2095	2003	77	793	793	38	576	9	127	2	0		41	5.17	0		0	
		2004	11	800	798	63	458	16	213	10	0		38	4.76	0		0	
		2005	23	702	697	44	425	9	69	122	0		28	4.02	0		0	
		2006	8	583	574	56	225	32	85	111	0		66	11.5	0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5B)																		
	2095	2007	8	492	485	25	279	14	68	80	0		19	3.92	0		0	
		2008	14	494	494	28	315	7	116	14	0		14	2.83	0		0	
		2009	91	699	678	38	331	14	188	77	0		30	4.42	0		0	
		2010	120	796	790	23	460	14	122	29	0		142	17.9	0		0	
	2096	2003	76	794	794	46	574	16	155	3	0		0		0		0	
		2004	37	805	803	141	492	23	144	3	0		0		0		0	
		2005	36	700	697	52	456	5	85	96	0		3	0.43	0		0	
		2006	20	618	613	27	313	12	73	188	0		0		0		0	
		2007	7	490	488	6	285	5	42	150	0		0		0		0	
		2008	11	500	494	33	289	9	151	12	0		0		0		0	
		2009	89	698	693	26	307	27	139	194	0		1	0.14	0		0	
		2010	116	790	786	265	297	27	163	33	0		1	0.13	0		0	
	2097	2003	11	791	791	3	666	116	0	3	0		0		3	0.38	0	
		2004	38	802	798	15	634	135	10	1	2	0.25	0		1	0.13	0	
		2005	28	696	694	45	492	132	7	17	0		0		2	0.29	0	
		2006	19	586	582	29	367	153	10	17	1	0.17	0		5	0.86	0	
		2007	6	489	487	0	392	43	5	47	0		0		0		0	
		2008	12	497	497	30	357	104	2	0	1	0.2	0		3	0.6	0	
		2009	117	697	687	35	553	71	4	19	1	0.15	0		4	0.58	0	
		2010	115	797	791	28	624	131	4	2	1	0.13	0		1	0.13	0	
	2098	2003	9	785	785	307	348	40	76	9	5	0.64	0		0		0	
		2004	36	804	803	100	516	96	79	1	11	1.37	0		0		0	
		2005	24	699	695	233	260	71	30	99	2	0.29	0		0		0	
		2006	18	596	589	11	305	22	20	231	3	0.51	0		0		0	
		2007	13	495	494	0	239	14	35	204	2	0.4	0		0		0	
		2008	5	499	498	273	140	58	22	3	2	0.4	0		0		0	
		2009	118	702	700	253	246	81	29	80	11	1.57	0		0		0	
		2010	96	793	783	13	543	84	86	61	0		0		0		0	
	2099	2003	8	792	792	235	462	17	61	8	1	0.13	8	1.01	0		0	
		2004	33	799	794	179	460	16	123	4	0		12	1.51	0		0	
		2005	25	699	697	138	318	15	41	182	2	0.29	1	0.14	0		0	
		2006	17	584	582	5	359	5	11	201	0		1	0.17	0		0	
		2007	14	493	486	0	266	4	8	151	0		2	0.41	0		0	
		2008	8	495	489	41	343	7	33	62	1	0.2	3	0.61	0		0	
		2009	119	692	691	239	309	8	23	106	5	0.72	2	0.29	0		0	
		2010	91	800	795	10	534	37	65	149	1	0.13	0		0		0	
	2100	2007	71	479	479	111	231	12	20	20	33	6.89	52	10.8	0		0	
		2009	73	695	679	30	509	22	32	44	9	1.33	34	5.01	0		0	
		2010	77	792	788	150	419	32	46	87	2	0.25	52	6.6	0		0	
	2101	2004	14	797	795	30	656	20	3	79	7	0.88	0		0		0	
		2006	3	588	577	34	447	24	13	57	2	0.35	0		0		0	
		2007	70	492	490	193	270	6	4	14	3	0.61	0		0		0	
		2009	72	694	689	2	608	25	12	34	8	1.16	0		0		0	
	2102	2003	79	796	796	232	498	38	22	3	2	0.25	1	0.13	0		0	
		2004	8	800	799	56	555	101	7	17	63	7.88	0		0		0	
		2006	4	589	579	27	326	105	19	55	48	8.29	0		0		0	
		2009	77	693	685	139	413	39	8	53	33	4.82	0		0		0	
	2103	2004	9	799	796	290	372	20	21	49	44	5.53	0		0		0	
		2009	78	697	681	32	419	19	11	89	112	16.4	0		0		0	
	2104	2006	21	586	586	5	298	28	43	213	0		0		0		0	
		2007	4	493	491	0	321	3	8	159	0		0		0		0	
		2009	92	695	695	14	357	28	71	223	2	0.29	0		0		0	
		2010	117	796	790	129	439	29	117	76	0		0		0		0	
	2105	2004	2	804	801	3	586	206	1	0	1	0.12	0		4	0.5	0	
		2006	33	594	583	7	398	156	4	9	3	0.51	0		7	1.2	0	
		2009	116	696	691	0	505	172	2	9	0		0		3	0.43	0	
		2010	100	798	796	3	602	182	3	3	1	0.13	0		3	0.38	0	
	2106	2004	32	800	798	160	424	30	165	2	7	0.88	10	1.25	0		0	
		2005	11	698	686	74	318	10	43	191	41	5.98	9	1.31	0		0	
		2006	34	591	583	180	235	20	19	89	40	6.86	0		0		0	
		2007	80	499	495	61	256	9	20	142	7	1.41	0		0		0	
		2009	115	690	678	16	487	16	53	71	25	3.69	10	1.47	0		0	
	2107	2003	16	793	791	324	390	35	33	2	7	0.88	0		0		0	
		2006	35	594	589	40	329	52	90	78	1	0.17	0		0		0	
		2007	81	495	489	15	286	6	87	94	1	0.2	0		0		0	
		2009	114	698	685	25	443	31	67	110	11	1.61	0		0		0	
		2010	92	790	784	42	445	98	117	68	14	1.79	0		0		0	

Area	Station	Year	SetHkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
5C/D																	
	2086	2005	59	702	700	64	535	37	11	7	45	6.43	0		1	0.14	0
		2006	71	597	596	55	368	57	11	17	86	14.4	1	0.17	1	0.17	0
		2007	48	487	475	72	303	37	10	26	23	4.84	5	1.05	0		0
		2009	74	696	666	20	458	34	27	23	102	15.3	2	0.3	0		0
	2100	2003	86	784	784	86	480	21	105	23	16	2.04	53	6.76	0		0
		2004	13	796	793	83	526	22	44	68	7	0.88	43	5.42	0		0
		2005	19	698	692	253	237	39	52	21	40	5.78	51	7.37	0		0
		2006	2	579	574	106	264	38	27	60	36	6.27	43	7.49	0		0
		2008	47	494	491	110	216	19	21	46	35	7.13	44	8.96	0		0
	2101	2003	85	789	789	305	466	11	5	2	0		0		0		0
		2005	18	700	695	246	358	41	12	24	13	1.87	1	0.14	0		0
		2008	48	489	485	167	247	18	6	41	6	1.24	0		0		0
		2010	112	799	789	380	316	58	8	19	8	1.01	0		0		0
	2102	2005	21	695	593	114	303	29	4	79	62	10.4	2	0.34	0		0
		2007	73	492	488	177	224	67	3	11	7	1.43	0		0		0
		2008	49	500	496	241	166	41	7	39	2	0.4	0		0		0
		2010	111	798	781	6	637	46	4	59	29	3.71	1	0.13	0		0
	2103	2003	80	792	792	361	353	11	63	2	2	0.25	0		0		0
		2005	22	702	698	59	361	8	6	260	4	0.57	0		0		0
		2006	7	592	583	30	378	14	14	97	52	8.92	0		0		0
		2007	74	488	483	109	318	14	11	28	3	0.62	0		0		0
		2008	13	491	491	205	211	10	11	25	29	5.91	0		0		0
		2010	110	794	790	155	494	14	45	66	13	1.65	3	0.38	0		0
	2104	2003	75	791	791	367	339	9	70	6	0		0		0		0
		2004	1	798	795	233	357	43	104	58	0		0		0		0
		2005	27	696	694	5	381	17	25	267	0		1	0.14	0		0
		2008	10	499	497	312	88	9	45	43	0		0		0		0
	2105	2003	10	793	793	7	587	195	1	0	3	0.38	0		0		0
		2005	26	698	694	61	489	128	1	10	0		0		5	0.72	0
		2007	5	493	486	10	384	72	1	18	0		0		1	0.21	0
		2008	9	492	491	37	343	111	0	0	0		0		0		0
	2106	2003	12	792	792	348	327	30	56	11	13	1.64	7	0.88	0		0
		2008	18	497	490	175	209	21	65	16	3	0.61	1	0.2	0		0
		2010	93	800	791	101	403	11	171	96	2	0.25	7	0.88	0		0
	2107	2004	31	798	796	113	545	37	92	4	5	0.63	0		0		0
		2005	10	699	687	52	376	33	75	153	2	0.29	0		0		0
		2008	19	500	499	30	249	17	174	24	5	1	0		0		0
	2108	2003	84	801	801	341	326	57	38	8	29	3.62	2	0.25	0		0
		2004	15	805	803	62	445	44	59	67	98	12.2	28	3.49	0		0
		2005	20	700	697	55	358	58	105	33	85	12.2	4	0.57	0		0
		2006	1	591	577	41	271	45	63	103	55	9.53	0		0		0
		2007	69	489	478	20	225	46	169	17	2	0.42	0		0		0
		2008	50	495	491	25	303	21	73	64	6	1.22	0		0		0
		2009	100	693	691	94	268	60	164	93	12	1.74	2	0.29	0		0
		2010	79	789	779	73	344	60	161	60	81	10.4	0		0		0
	2109	2003	82	785	785	214	479	19	23	16	33	4.2	1	0.13	0		0
		2004	7	798	797	33	589	48	33	67	27	3.39	0		0		0
		2005	13	697	690	18	439	31	10	179	15	2.17	0		0		0
		2006	5	577	566	13	400	23	30	51	50	8.83	0		0		0
		2007	72	493	488	77	271	33	49	43	15	3.07	0		0		0
		2008	54	495	490	40	322	11	32	70	15	3.06	0		0		0
		2009	101	707	702	65	421	25	39	125	27	3.85	0		0		0
		2010	80	796	769	3	519	19	27	148	53	6.89	0		0		0
	2110	2003	81	785	785	19	486	7	46	2	225	28.6	0		0		0
		2004	6	792	792	253	343	31	76	22	67	8.46	0		0		0
		2005	12	697	692	50	408	23	60	63	89	12.8	0		0		0
		2006	6	598	589	7	364	32	45	134	9	1.53	0		0		0
		2007	75	497	476	5	336	15	15	22	84	17.6	0		0		0
		2008	53	490	487	9	370	12	32	14	50	10.2	0		0		0
		2009	94	695	686	2	417	9	36	63	160	23.3	0		0		0
		2010	109	795	782	2	519	11	50	22	179	22.8	0		0		0
	2111	2003	74	794	794	252	423	30	45	11	33	4.16	0		0		0
		2004	5	794	793	110	434	39	36	127	47	5.93	0		0		0
		2005	16	700	695	32	296	33	18	309	7	1.01	0		0		0
		2006	32	586	581	22	340	7	13	190	9	1.55	0		0		0

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5C/D)																		
	2111	2007	76	490	489	130	213	23	25	78	20	4.09	0		0		0	
		2008	58	497	495	294	125	13	37	20	6	1.21	0		0		0	
		2009	93	698	685	25	394	25	24	193	24	3.5	0		0		0	
		2010	108	798	792	22	619	39	50	54	9	1.14	0		0		0	
	2112	2003	73	790	790	42	620	101	15	0	9	1.14	0		3	0.38	0	
		2004	3	801	797	0	594	161	17	1	8	1	0		16	2.01	0	
		2005	8	700	696	7	447	119	48	43	5	0.72	0		29	4.17	0	
		2006	31	590	587	23	396	146	6	7	0		0		10	1.7	0	
		2007	79	491	484	5	363	90	12	10	3	0.62	0		1	0.21	0	
		2008	61	490	488	10	396	73	2	0	6	1.23	0		1	0.2	0	
		2009	102	692	676	16	544	90	11	10	4	0.59	0		1	0.15	0	
		2010	101	796	785	11	593	132	7	10	8	1.02	0		29	3.69	0	
	2113	2003	18	775	774	362	312	21	64	9	0		6	0.78	0		0	
		2004	30	798	798	81	542	23	104	6	7	0.88	35	4.39	0		0	
		2005	9	698	688	13	362	4	51	257	0		1	0.15	0		0	
		2006	37	590	589	320	173	4	14	67	7	1.19	4	0.68	0		0	
		2007	83	496	496	9	265	10	25	184	0		3	0.6	0		0	
		2009	103	692	691	233	219	7	29	196	4	0.58	3	0.43	0		0	
		2010	102	796	789	188	414	14	87	68	0		18	2.28	0		0	
	2114	2003	17	787	787	367	323	16	72	9	0		0		0		0	
		2004	29	799	798	119	549	27	99	4	0		0		0		0	
		2005	38	696	694	321	223	15	71	64	0		0		0		0	
		2006	36	596	596	49	343	5	29	170	0		0		0		0	
		2007	82	498	494	10	310	3	55	117	0		0		0		0	
		2008	20	492	482	216	193	4	45	24	0		0		0		0	
		2009	113	696	690	111	352	11	30	186	0		0		0		0	
		2010	88	794	793	19	526	52	95	101	0		0		0		0	
	2115	2003	83	786	786	262	436	20	31	14	0		7	0.89	0		16	2.04
		2004	16	804	803	44	586	6	29	106	0		17	2.12	0		15	1.87
		2005	14	700	690	151	366	6	17	144	0		0		0		6	0.87
		2006	25	588	583	184	174	11	76	120	0		9	1.54	0		9	1.54
		2007	3	490	479	130	224	10	76	37	0		0		0		1	0.21
		2008	51	499	491	42	302	3	30	113	0		0		0		1	0.2
		2009	99	697	690	106	318	17	86	137	0		16	2.32	0		10	1.45
		2010	81	795	781	1	466	12	97	175	0		12	1.54	0		18	2.3
	2116	2003	32	795	795	44	501	27	100	79	17	2.14	27	3.4	0		0	
		2004	17	798	797	153	389	104	68	47	16	2.01	20	2.51	0		0	
		2005	17	696	693	36	378	34	48	157	22	3.17	22	3.17	0		0	
		2006	26	595	590	3	338	22	74	139	6	1.02	8	1.36	0		0	
		2007	2	491	486	0	291	11	18	159	4	0.82	4	0.82	0		0	
		2008	52	495	494	17	263	3	74	113	9	1.82	16	3.24	0		0	
		2009	98	696	685	46	321	60	67	156	24	3.5	11	1.61	0		0	
		2010	103	797	793	8	418	39	84	168	44	5.55	33	4.16	0		0	
	2117	2003	33	792	792	270	451	23	24	14	10	1.26	0		0		0	
		2004	4	802	799	239	403	46	34	13	64	8.01	0		0		0	
		2005	15	703	696	187	299	41	13	130	25	3.59	0		1	0.14	0	
		2006	27	588	579	25	315	67	14	119	41	7.08	0		0		0	
		2007	77	491	484	15	341	32	43	35	19	3.93	0		0		0	
		2008	57	499	497	183	211	27	40	5	30	6.04	0		1	0.2	0	
		2009	95	693	687	62	383	44	50	95	53	7.71	0		0		0	
		2010	107	792	782	43	588	60	31	35	27	3.45	0		0		0	
	2118	2003	72	800	800	262	456	54	18	4	6	0.75	0		0		0	
		2004	25	799	796	90	576	62	30	13	23	2.89	0		2	0.25	0	
		2005	7	697	690	24	414	44	16	169	18	2.61	0		6	0.87	0	
		2006	30	593	589	16	407	74	18	68	10	1.7	0		0		0	
		2007	78	498	488	63	287	53	38	39	8	1.64	0		0		0	
		2008	60	504	502	281	149	38	18	8	6	1.2	0		2	0.4	0	
		2009	105	697	679	138	369	54	44	64	10	1.47	0		0		0	
		2010	106	798	797	129	548	97	4	7	12	1.51	0		0		0	
	2119	2003	26	790	790	213	396	11	82	28	0		60	7.59	0		0	
		2004	26	797	795	114	495	24	110	29	0		23	2.89	0		0	
		2005	40	699	693	66	370	19	98	74	0		63	9.09	0		3	0.43
		2006	39	595	593	15	286	15	50	164	0		62	10.4	0		1	0.17
		2007	33	501	500	7	310	9	21	137	0		17	3.4	0		0	
		2008	62	495	491	195	208	7	45	12	0		24	4.89	0		0	
		2009	104	691	686	14	294	19	64	235	0		59	8.6	0		1	0.15
		2010	90	800	797	66	384	19	121	128	0		78	9.79	0		1	0.13

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5C/D)																		
	2120	2003	25	796	794	303	387	4	57	39	0		2	0.25	0		2	0.25
		2004	28	800	798	200	476	7	73	11	0		26	3.26	0		5	0.63
		2005	39	692	691	195	312	2	84	88	1	0.14	4	0.58	0		5	0.72
		2006	38	589	588	39	333	6	14	194	0		1	0.17	0		2	0.34
		2007	32	495	490	2	310	3	21	155	0		0		0		0	
		2008	63	490	487	369	86	4	18	7	0		1	0.21	0		2	0.41
		2009	112	699	697	300	186	6	49	125	0		23	3.3	0		8	1.15
		2010	89	793	790	177	421	23	78	78	0		7	0.89	0		6	0.76
	2121	2003	31	791	791	70	572	22	20	78	25	3.16	4	0.51	0		0	
		2004	18	799	795	22	490	72	116	68	16	2.01	11	1.38	0		0	
		2005	6	701	696	2	495	30	10	160	4	0.57	0		0		0	
		2006	24	595	591	42	290	54	15	142	44	7.45	4	0.68	0		0	
		2007	1	488	482	0	313	1	8	154	7	1.45	1	0.21	0		0	
		2008	55	493	492	71	260	15	43	72	29	5.89	2	0.41	0		0	
		2009	97	697	695	26	482	31	30	111	14	2.01	3	0.43	0		0	
		2010	104	796	784	49	562	25	12	87	41	5.23	12	1.53	0		0	
	2122	2003	30	797	796	58	628	68	15	9	18	2.26	0		0		0	
		2004	24	794	787	3	645	91	9	31	8	1.02	0		0		0	
		2005	5	699	697	9	489	64	8	126	1	0.14	0		0		0	
		2006	28	593	592	25	352	115	15	78	5	0.84	0		5	0.84	0	
		2007	36	495	494	13	330	73	25	50	3	0.61	0		0		0	
		2008	56	493	491	76	294	68	10	1	36	7.33	0		6	1.22	0	
		2009	96	700	693	47	481	85	17	44	10	1.44	0		9	1.3	0	
		2010	105	793	791	173	503	40	11	60	4	0.51	0		0		0	
	2123	2003	29	793	793	245	466	40	7	25	10	1.26	0		0		0	
		2004	23	790	790	58	521	57	12	36	106	13.4	0		0		0	
		2005	42	702	696	332	196	57	14	72	25	3.59	0		0		0	
		2006	29	589	589	33	333	56	10	137	22	3.74	0		0		0	
		2007	35	499	480	27	313	21	16	57	46	9.58	0		0		0	
		2008	59	493	491	269	165	21	9	9	17	3.46	0		1	0.2	0	
		2009	110	690	685	21	453	39	26	74	72	10.5	0		0		0	
		2010	86	798	792	32	510	69	21	128	32	4.04	0		0		0	
	2124	2003	27	797	796	433	238	5	83	20	1	0.13	16	2.01	0		0	
		2004	27	800	798	61	480	26	113	63	0		55	6.89	0		0	
		2005	41	700	696	410	147	19	56	40	0		24	3.45	0		0	
		2006	40	590	584	71	280	10	53	107	1	0.17	62	10.6	0		0	
		2007	34	497	492	8	295	3	36	131	0		19	3.86	0		0	
		2008	67	496	492	344	71	20	22	12	1	0.2	22	4.47	0		0	
		2009	111	693	690	118	276	18	49	184	0		45	6.52	0		0	
		2010	87	800	798	130	317	51	128	152	0		20	2.51	0		0	
	2125	2003	34	792	792	152	502	73	5	11	49	6.19	0		0		0	
		2004	19	798	798	69	623	80	4	2	19	2.38	0		1	0.13	0	
		2005	4	697	697	58	455	68	6	50	58	8.32	0		2	0.29	0	
		2006	42	587	584	69	378	108	5	4	18	3.08	0		2	0.34	0	
		2007	37	491	489	0	353	64	8	58	8	1.64	0		0		0	
		2008	22	489	482	148	255	38	4	9	27	5.6	0		1	0.21	0	
		2009	108	687	676	5	437	115	16	87	14	2.07	0		4	0.59	0	
		2010	83	794	791	0	548	79	0	135	33	4.17	0		1	0.13	0	
	2126	2003	28	797	797	331	398	37	4	13	14	1.76	0		0		0	
		2004	22	801	801	37	563	77	26	45	53	6.62	0		0		0	
		2005	43	701	701	270	215	60	14	125	17	2.43	0		0		0	
		2006	41	593	590	151	269	68	13	45	44	7.46	0		0		0	
		2007	38	496	493	2	356	14	15	96	9	1.83	0		0		0	
		2008	21	496	494	295	132	25	5	26	11	2.23	0		0		0	
		2009	109	701	696	91	462	20	17	66	40	5.75	0		0		0	
		2010	85	795	793	1	603	71	10	101	8	1.01	0		0		0	
	2127	2003	36	785	785	81	559	33	20	36	43	5.48	11	1.4	0		2	0.25
		2004	21	804	803	38	662	62	7	26	8	1	0		0		0	
		2005	3	700	694	90	407	94	13	34	57	8.21	0		0		0	
		2006	23	594	587	6	339	78	29	121	18	3.07	0		0		0	
		2007	20	494	479	2	328	27	24	70	29	6.05	0		0		0	
		2008	24	499	497	40	330	63	30	10	23	4.63	1	0.2	0		0	
		2009	107	701	689	68	394	94	24	29	80	11.6	0		0		0	
		2010	82	791	787	271	308	113	7	35	52	6.61	0		1	0.13	0	
	2128	2003	35	798	798	74	528	40	26	71	53	6.64	6	0.75	0		0	
		2004	20	796	794	15	619	33	21	72	33	4.16	1	0.13	0		0	
		2005	2	691	690	21	460	46	17	135	11	1.59	1	0.14	0		0	
		2006	22	592	536	4	342	11	11	151	17	3.17	0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5C/D)																		
	2128	2007	19	493	492	0	325	2	1	156	8	1.63	0		0		0	
		2008	23	497	490	61	330	26	24	10	38	7.76	1	0.2	0		0	
		2009	106	699	681	132	296	46	25	118	64	9.4	2	0.29	0		0	
		2010	84	797	793	2	565	29	17	169	10	1.26	3	0.38	0		0	
	2129	2003	14	787	785	102	471	27	140	8	0		24	3.06	0		13	1.66
		2004	2	799	585	83	298	13	105	83	0		3	0.51	0		0	
		2005	34	697	692	100	391	20	95	72	0		5	0.72	0		10	1.45
		2006	10	597	590	99	386	12	69	12	0		6	1.02	0		6	1.02
		2007	30	497	481	13	314	2	26	108	0		12	2.49	0		8	1.66
		2008	64	488	487	166	248	8	46	11	0		4	0.82	0		5	1.03
		2009	51	702	701	224	270	21	68	95	0		17	2.43	0		6	0.86
		2010	139	801	796	349	286	15	77	38	0		19	2.39	0		14	1.76
	2130	2003	13	787	783	75	429	18	47	202	0		5	0.64	0		7	0.89
		2004	1	804	801	32	340	4	7	413	0		3	0.37	0		2	0.25
		2005	35	698	696	63	368	24	34	192	0		8	1.15	0		7	1.01
		2006	11	596	592	150	301	23	16	88	1	0.17	9	1.52	0		4	0.68
		2007	31	488	483	2	251	5	6	212	0		5	1.04	0		2	0.41
		2008	65	498	494	175	198	21	20	76	0		3	0.61	0		1	0.2
		2009	50	700	695	221	240	35	32	167	0		3	0.43	0		0	
		2010	140	807	797	253	338	36	47	115	0		8	1	0		1	0.13
	2131	2003	24	791	789	30	626	27	100	6	0		0		0		0	
		2004	4	800	796	46	260	10	56	424	0		0		0		0	
		2005	32	693	692	42	447	18	55	132	0		0		0		0	
		2006	12	595	589	143	320	19	82	25	0		1	0.17	0		0	
		2007	29	494	489	0	309	2	50	127	0		0		0		0	
		2008	68	492	488	126	266	20	54	22	0		0		0		0	
		2009	53	699	699	3	313	7	14	362	0		0		0		0	
		2010	137	803	803	58	397	32	138	180	0		0		0		1	0.12
	2132	2003	15	792	791	14	605	6	41	124	0		1	0.13	0		0	
		2004	3	796	796	177	362	16	77	163	0		1	0.13	0		0	
		2005	33	694	693	118	365	14	62	133	0		0		0		2	0.29
		2006	9	598	595	121	367	9	83	14	0		0		0		1	0.17
		2007	28	496	488	46	300	8	23	114	0		0		0		0	
		2008	66	504	503	100	315	3	64	20	0		0		0		1	0.2
		2009	52	703	701	34	298	10	50	310	0		1	0.14	0		2	0.29
		2010	138	801	801	86	348	10	69	285	0		0		0		4	0.5
	2133	2003	22	790	789	374	300	25	56	14	0		20	2.53	0		0	
		2004	6	789	788	173	278	3	36	291	0		7	0.89	0		0	
		2005	30	693	690	52	414	17	55	150	0		2	0.29	0		0	
		2006	14	583	583	71	385	9	14	95	0		9	1.54	0		0	
		2007	26	491	491	0	351	1	9	130	0		0		0		0	
		2008	70	485	482	295	124	9	34	17	0		3	0.62	0		0	
		2009	55	702	702	53	385	4	29	231	0		0		0		0	
		2010	135	806	805	298	315	6	54	96	0		29	3.6	0		8	0.99
	2134	2003	23	790	789	1	537	5	15	231	0		0		0		0	
		2004	5	796	795	98	274	17	34	372	0		0		0		0	
		2005	31	699	698	21	403	25	43	206	0		0		0		0	
		2006	13	599	593	53	339	38	31	132	0		0		0		0	
		2007	27	496	492	5	257	13	12	205	0		0		0		0	
		2008	69	499	499	150	176	62	15	97	0		0		0		0	
		2009	54	706	706	19	351	20	36	283	0		0		0		0	
		2010	136	799	793	4	335	8	54	395	0		0		0		0	
	2135	2003	20	788	785	20	634	42	15	8	66	8.41	0		0		0	
		2004	41	795	794	51	527	86	18	35	77	9.7	0		0		0	
		2005	28	696	695	30	496	101	4	10	55	7.91	0		0		0	
		2006	17	598	591	20	472	41	5	20	33	5.58	0		0		0	
		2007	84	496	491	56	349	24	5	14	42	8.55	0		1	0.2	0	
		2008	72	488	486	93	324	28	2	6	33	6.79	0		0		0	
		2009	57	697	696	13	458	103	22	56	46	6.61	0		0		0	
		2010	133	800	800	104	539	82	6	8	61	7.62	0		0		0	
	2136	2003	21	795	795	188	478	44	48	37	0		0		0		0	
		2004	40	799	798	40	449	32	27	250	0		0		0		0	
		2005	29	699	699	0	496	29	17	161	0		0		0		0	
		2006	18	595	594	9	464	19	49	52	0		0		0		0	
		2007	25	481	481	0	323	1	5	152	0		0		0		0	
		2008	71	489	484	261	148	13	32	30	0		0		0		0	
		2009	56	705	705	2	457	6	16	225	0		0		0		0	
		2010	134	801	798	296	337	8	42	115	0		0		0		0	

Area Station (5C/D)	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
2137	2003	19	786	781	37	576	26	32	88	16	2.05	6	0.77	0		0	
	2004	42	784	781	42	522	19	51	114	9	1.15	24	3.07	0		0	
	2005	27	700	695	64	422	42	48	80	23	3.31	16	2.3	0		0	
	2006	16	601	592	15	443	33	15	56	24	4.05	5	0.84	0		1	0.17
	2007	85	491	484	59	330	16	15	38	19	3.93	7	1.45	0		0	
	2008	73	495	484	129	250	9	27	32	36	7.44	3	0.62	0		0	
	2009	58	703	701	31	449	14	32	142	7	1	26	3.71	0		0	
	2010	132	805	803	91	509	17	17	140	26	3.24	4	0.5	0		0	
2138	2003	63	798	798	145	550	30	0	56	16	2.01	1	0.13	0		0	
	2004	39	795	793	41	487	40	11	198	15	1.89	1	0.13	0		0	
	2005	24	695	695	103	455	67	7	19	42	6.04	2	0.29	0		0	
	2006	21	600	594	18	447	35	13	67	17	2.86	2	0.34	0		0	
	2007	68	492	489	6	367	18	12	79	8	1.64	0		0		0	
	2008	83	493	490	343	83	14	6	25	19	3.88	0		0		0	
	2009	61	698	695	4	504	25	14	143	6	0.86	0		0		0	
	2010	131	807	807	126	531	43	6	84	14	1.73	3	0.37	0		0	
2139	2003	62	793	793	6	552	39	26	170	0		0		0		0	
	2004	38	793	791	2	547	3	25	214	0		0		0		0	
	2005	36	699	698	36	441	57	31	132	0		2	0.29	0		0	
	2006	20	597	594	8	469	25	14	78	0		0		0		0	
	2007	67	492	491	1	357	7	9	117	0		0		0		0	
	2008	81	491	491	168	203	33	15	71	0		1	0.2	0		0	
	2009	62	703	703	1	424	4	15	260	0		1	0.14	0		0	
	2010	128	806	802	77	385	24	54	265	0		0		0		0	
2140	2003	65	793	793	5	634	21	78	50	0		1	0.13	0		4	0.5
	2004	43	790	789	84	487	34	163	9	0		5	0.63	0		7	0.89
	2005	26	694	690	62	457	55	70	44	0		0		0		3	0.43
	2006	15	596	583	64	384	47	56	21	0		4	0.69	0		7	1.2
	2007	86	488	487	34	348	19	62	23	0		1	0.21	0		0	
	2008	74	495	490	19	344	13	95	14	0		4	0.82	0		1	0.2
	2009	59	703	702	190	391	63	32	22	0		1	0.14	0		3	0.43
	2010	129	806	804	392	246	25	111	25	0		3	0.37	0		2	0.25
2141	2003	64	792	792	19	586	52	102	12	0		10	1.26	0		11	1.39
	2004	44	790	787	101	421	65	137	2	0		39	4.96	0		22	2.8
	2005	25	695	694	199	343	37	34	52	0		18	2.59	0		11	1.59
	2006	22	593	584	65	390	37	34	8	0		31	5.31	0		20	3.42
	2007	65	475	465	86	265	17	43	3	0		36	7.74	0		15	3.23
	2008	84	492	491	61	253	60	78	8	0		21	4.28	0		10	2.04
	2009	60	702	702	73	410	57	132	10	0		17	2.42	0		4	0.57
	2010	130	804	801	112	387	29	225	4	0		14	1.75	0		31	3.87
2142	2003	61	787	786	62	554	33	18	110	8	1.02	1	0.13	0		0	
	2004	37	799	795	258	321	54	32	128	2	0.25	0		0		0	
	2005	37	697	696	64	408	37	46	136	5	0.72	0		0		0	
	2006	19	598	594	31	424	19	43	59	18	3.03	0		0		0	
	2007	66	491	490	58	313	31	19	65	2	0.41	1	0.2	0		1	0.2
	2008	82	492	490	289	120	11	35	34	0		1	0.2	0		0	
	2009	63	703	703	104	380	19	75	125	0		1	0.14	0		0	
	2010	127	803	802	216	314	50	69	143	10	1.25	0		0		0	
2145	2003	60	793	793	147	497	34	40	75	0		0		0		0	
	2004	36	793	790	182	417	76	67	48	0		0		0		0	
	2005	38	693	691	24	432	46	45	145	0		0		0		0	
	2006	7	598	597	41	379	64	22	95	0		0		0		0	
	2007	24	488	488	52	314	31	17	75	0		0		0		0	
	2008	80	490	488	146	245	33	49	15	0		0		0		0	
	2009	64	701	701	6	488	16	56	136	0		0		0		0	
	2010	126	801	801	417	172	86	110	16	0		0		0		0	
2147	2003	59	789	770	25	623	28	54	40	0		0		0		0	
	2004	34	790	788	120	464	114	70	19	0		0		0		1	0.13
	2005	39	694	694	72	487	38	34	63	0		0		0		0	
	2006	8	598	597	18	344	76	25	135	0		0		0		0	
	2007	23	487	483	28	363	25	26	38	0		0		0		0	
	2008	85	489	488	150	260	33	30	15	0		0		0		0	
	2009	66	702	700	54	443	17	30	157	0		0		0		0	
	2010	125	804	804	225	407	62	81	29	0		0		0		0	
2148	2003	58	794	792	72	538	54	63	65	0		0		0		0	
	2004	35	802	800	226	320	109	69	76	0		0		0		0	
	2005	40	694	693	95	392	45	43	118	0		0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5C/D)																		
	2148	2006	6	597	597	40	404	39	44	70	0		0		0		0	
		2007	21	503	501	47	311	52	63	27	0		0		0		0	
		2008	79	495	493	53	275	16	61	88	0		0		0		0	
		2009	65	701	701	152	316	53	104	76	0		0		0		0	
		2010	124	804	798	207	400	86	91	14	0		0		0		0	
	2150	2003	57	790	788	32	570	121	34	29	2	0.25	0		0		0	
		2004	33	794	788	154	329	151	130	24	0		0		0		0	
		2005	41	698	694	41	428	70	67	89	0		0		0		0	
		2006	5	598	596	42	299	127	98	35	0		0		0		0	
		2007	22	490	489	31	320	69	58	12	0		0		0		0	
		2008	86	499	496	48	269	53	112	16	0		0		0		0	
		2009	67	705	705	62	426	72	108	39	0		0		0		0	
		2010	123	803	802	41	361	229	166	8	0		0		0		0	
	2152	2003	56	780	780	18	601	84	27	48	0		1	0.13	0		1	0.13
		2004	7	802	798	102	496	53	31	114	0		0		0		2	0.25
		2005	44	693	693	99	470	67	20	43	0		0		0		0	
		2006	23	594	588	94	375	50	10	57	0		3	0.51	0		1	0.17
		2007	39	498	497	114	286	31	33	28	0		0		0		6	1.21
		2008	46	491	490	135	273	33	14	34	0		0		0		1	0.2
		2009	93	707	706	87	487	19	15	98	0		0		0		0	
		2010	122	803	803	125	566	36	12	58	0		4	0.5	0		3	0.37
	2153	2003	51	796	795	2	608	55	121	9	0		0		0		0	
		2004	32	782	781	65	465	80	138	33	0		0		0		0	
		2005	16	696	694	4	606	9	56	21	0		0		0		0	
		2006	41	591	581	2	452	34	27	75	0		0		0		0	
		2007	57	498	493	2	400	10	11	74	0		0		0		0	
		2008	40	492	489	1	353	14	111	12	0		0		0		0	
		2009	84	703	703	11	359	67	194	72	0		0		0		0	
		2010	112	804	803	13	430	56	292	13	0		0		0		0	
	2154	2003	50	794	793	3	641	6	103	40	0		0		0		0	
		2004	31	800	791	3	566	67	90	65	0		0		0		0	
		2005	15	695	693	0	561	24	50	62	0		0		0		0	
		2006	34	590	578	3	439	16	5	117	0		0		0		0	
		2007	42	501	498	0	390	22	42	50	0		0		0		0	
		2008	31	492	488	5	354	32	45	55	0		0		0		0	
		2009	82	704	703	38	439	33	71	126	0		0		0		0	
		2010	111	803	803	2	534	52	180	35	0		0		0		0	
	2155	2003	49	793	792	3	637	47	87	18	0		0		0		0	
		2004	19	795	792	7	588	67	49	81	0		0		0		0	
		2005	12	696	693	28	497	93	60	18	0		0		0		0	
		2006	33	597	596	25	352	112	54	45	0		8	1.34	0		4	0.67
		2007	45	498	496	5	338	83	48	30	0		0		0		0	
		2008	32	501	500	10	332	81	62	17	0		0		0		0	
		2009	79	705	704	17	422	43	89	133	0		0		0		0	
		2010	108	805	804	31	525	35	162	51	0		0		0		0	
	2158	2003	55	778	777	54	555	91	31	32	0		7	0.9	0		7	0.9
		2004	8	792	789	103	517	71	64	4	0		5	0.63	0		9	1.14
		2005	43	695	693	151	384	60	43	45	0		5	0.72	0		5	0.72
		2006	24	599	596	195	283	71	27	17	0		2	0.34	0		1	0.17
		2007	40	493	491	80	335	30	27	12	0		1	0.2	0		7	1.43
		2008	45	496	496	176	232	37	23	21	0		3	0.6	0		4	0.81
		2009	91	702	701	282	295	37	28	38	1	0.14	10	1.43	1	0.14	9	1.28
		2010	120	804	803	189	461	82	21	30	1	0.12	9	1.12	0		10	1.25
	2159	2003	71	794	794	29	549	92	124	0	0		0		0		0	
		2004	12	798	795	33	397	144	208	13	0		0		0		0	
		2005	23	694	690	24	470	68	119	15	0		0		0		0	
		2006	4	597	595	35	391	107	56	8	0		0		0		0	
		2007	64	491	491	46	267	81	81	16	0		0		0		0	
		2008	75	501	498	66	229	110	78	17	0		0		0		0	
		2009	90	704	700	68	270	104	145	114	0		0		0		0	
		2010	119	799	795	46	441	89	209	10	0		0		0		0	
	2160	2003	66	790	790	10	626	108	33	3	10	1.27	0		0		0	
		2004	13	800	799	13	646	80	16	41	3	0.38	0		0		0	
		2005	20	698	696	1	533	141	5	4	13	1.87	0		0		0	
		2006	1	601	601	7	474	84	10	16	11	1.83	0		0		0	
		2007	63	495	492	0	388	62	6	25	12	2.44	0		0		0	
		2008	76	479	474	4	295	52	39	16	68	14.3	0		0		0	
		2009	89	705	703	16	389	82	110	52	54	7.68	0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5C/D)																		
	2160	2010	118	806	806	0	517	109	79	16	89	11.0	0		0		0	
	2161	2003	67	794	794	15	615	118	36	6	4	0.5	0		0		0	
		2004	14	793	793	16	652	38	34	53	0		0		0		0	
		2005	18	698	698	11	552	70	24	27	14	2.01	0		0		0	
		2006	43	596	593	1	435	86	25	41	5	0.84	1	0.17	0		0	
		2007	59	494	493	0	405	20	32	33	3	0.61	0		0		0	
		2008	42	496	494	7	304	91	70	16	6	1.21	0		0		0	
		2009	85	704	701	111	321	120	80	60	10	1.43	0		0		0	
		2010	114	805	802	64	430	131	153	7	17	2.12	0		0		0	
	2162	2003	52	794	793	2	636	128	14	3	9	1.13	0		1	0.13	0	
		2004	15	795	788	57	510	171	14	21	15	1.9	0		0		0	
		2005	17	701	695	6	516	145	7	13	6	0.86	1	0.14	4	0.58	0	
		2006	42	589	584	11	433	114	9	4	5	0.86	0		8	1.37	0	
		2007	58	494	492	1	407	55	4	19	1	0.2	0		5	1.02	0	
		2008	41	496	483	16	305	112	16	13	8	1.66	0		13	2.69	0	
		2009	83	702	700	110	345	144	38	27	28	4	0		8	1.14	0	
		2010	113	801	798	78	469	206	26	1	16	2.01	0		2	0.25	0	
	2163	2003	53	791	787	29	616	93	38	0	11	1.4	0		0		0	
		2004	30	788	784	265	323	82	83	20	9	1.15	0		2	0.26	0	
		2005	14	701	696	54	454	114	40	12	20	2.87	0		2	0.29	0	
		2006	35	591	590	39	397	96	34	10	12	2.03	0		2	0.34	0	
		2007	43	494	493	4	378	40	24	45	3	0.61	0		0		0	
		2008	30	484	477	65	222	92	59	12	16	3.35	0		11	2.31	0	
		2009	81	705	702	106	323	103	83	60	27	3.85	1	0.14	0		0	
		2010	110	802	784	397	293	45	40	2	7	0.89	0		0		0	
	2164	2003	48	787	780	63	491	171	18	1	15	1.92	0		21	2.69	0	
		2004	18	776	768	42	453	158	37	23	24	3.12	0		31	4.04	0	
		2005	13	701	697	38	415	145	12	1	11	1.58	0		75	10.7	0	
		2006	36	592	587	95	337	94	17	12	9	1.53	0		23	3.92	0	
		2007	44	494	492	0	356	72	22	38	4	0.81	0		1	0.2	0	
		2008	29	496	489	37	274	106	21	3	7	1.43	0		41	8.38	0	
		2009	80	700	700	59	329	205	36	30	14	2	0		28	4	0	
		2010	109	797	789	157	417	176	18	2	9	1.14	0		10	1.27	0	
	2165	2003	44	795	791	12	598	164	13	0	0		0		4	0.51	0	
		2004	17	798	795	98	415	213	32	1	0		0		36	4.53	0	
		2005	11	700	693	21	454	165	18	0	1	0.14	0		35	5.05	0	
		2006	31	593	573	43	336	153	24	2	0		0		17	2.97	0	
		2007	56	497	484	2	353	95	9	5	0		0		20	4.13	0	
		2008	35	490	482	17	315	113	24	6	0		0		7	1.45	0	
		2009	78	703	697	42	384	191	50	19	0		0		11	1.58	0	
		2010	107	805	792	76	587	107	17	1	0		0		4	0.51	0	
	2169	2003	54	787	787	8	626	116	7	29	0		0		0		1	0.13
		2004	9	796	796	286	346	106	47	11	0		0		0		0	
		2005	42	698	696	3	504	61	19	118	0		0		0		0	
		2006	25	596	595	31	420	93	16	35	0		0		0		1	0.17
		2007	41	487	487	5	396	18	25	42	0		1	0.21	0		0	
		2008	44	493	488	124	237	67	17	41	0		1	0.2	0		1	0.2
		2009	92	702	701	226	371	38	20	46	0		0		0		0	
		2010	121	807	805	92	578	65	31	37	0		1	0.12	0		1	0.12
	2170	2003	70	797	797	8	571	47	106	65	0		0		0		0	
		2004	10	793	792	99	508	60	83	42	0		0		0		0	
		2005	22	698	696	54	420	100	104	17	2	0.29	0		0		0	
		2006	3	599	595	28	419	78	43	26	1	0.17	0		0		0	
		2007	62	501	495	25	322	58	74	16	0		0		0		0	
		2008	78	501	498	36	276	45	115	23	3	0.6	0		0		0	
		2009	88	703	703	271	245	55	67	64	0		1	0.14	0		0	
		2010	117	803	800	149	319	161	151	20	0		0		0		0	
	2171	2003	69	797	797	139	479	77	54	6	3	0.38	36	4.52	0		3	0.38
		2004	11	792	789	151	396	73	99	58	1	0.13	10	1.27	0		1	0.13
		2005	21	697	696	99	382	112	30	31	15	2.16	28	4.02	0		0	
		2006	2	599	596	28	396	75	60	20	1	0.17	14	2.35	0		2	0.34
		2007	61	495	490	38	336	24	32	53	4	0.82	3	0.61	0		0	
		2008	77	491	488	87	226	50	103	11	3	0.61	9	1.84	0		1	0.2
		2009	87	705	702	244	205	39	152	24	1	0.14	34	4.84	0		3	0.43
		2010	116	803	802	227	356	46	94	13	1	0.12	53	6.61	0		13	1.62
	2172	2003	68	793	793	8	662	99	11	4	0		0		0		0	
		2004	16	793	790	28	594	144	17	7	0		0		0		0	

Area	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
(5C/D)																		
	2172	2005	19	703	700	1	562	132	7	1	0		0		0		0	
		2006	44	592	587	0	463	114	11	1	0		0		0		0	
		2007	60	503	501	1	419	76	4	1	0		0		0		0	
		2008	43	483	479	4	405	56	13	1	0		0		0		0	
		2009	86	704	704	26	521	134	19	4	0		0		0		0	
		2010	115	806	800	12	648	135	5	0	0		0		0		0	
5E																		
	2143	2003	39	790	788	56	525	40	131	23	0		13	1.65	0		0	
		2004	26	798	794	48	487	46	126	72	0		13	1.64	0		2	0.25
		2005	1	696	694	94	421	44	78	55	0		4	0.58	0		0	
		2006	26	597	592	59	305	106	68	49	0		6	1.01	0		0	
		2007	53	494	492	35	289	29	60	72	0		7	1.42	0		0	
		2008	25	492	489	58	283	49	66	27	0		6	1.23	0		0	
		2009	68	704	703	151	253	19	83	175	0		17	2.42	0		5	0.71
		2010	97	809	807	430	204	26	94	34	0		19	2.35	0		0	
	2144	2003	38	796	795	204	454	71	13	15	0		0		38	4.78	0	
		2004	25	793	785	473	201	62	36	11	0		0		2	0.25	0	
		2005	2	696	692	299	234	41	56	58	0		2	0.29	2	0.29	0	
		2006	27	599	594	345	193	41	12	3	0		0		0		0	
		2007	52	494	493	134	289	29	25	14	0		0		1	0.2	0	
		2008	26	490	480	207	199	27	38	11	0		0		0		0	
		2009	69	701	699	390	135	48	100	26	0		0		0		0	
		2010	98	799	798	517	207	30	28	16	0		0		0		0	
	2146	2003	37	796	794	43	479	111	19	9	44	5.54	0		89	11.2	0	
		2004	27	795	791	25	412	185	20	17	30	3.79	0		102	12.9	0	
		2005	3	692	687	25	375	98	15	7	36	5.24	0		131	19.0	0	
		2006	28	593	589	5	369	75	22	6	16	2.72	0		97	16.4	0	
		2007	51	488	487	3	326	97	19	9	6	1.23	0		27	5.54	0	
		2008	27	496	493	17	283	122	21	1	7	1.42	0		41	8.32	0	
		2009	70	703	703	47	370	107	22	16	47	6.69	0		94	13.3	0	
		2010	99	803	801	176	427	98	13	13	52	6.49	0		22	2.75	0	
	2149	2003	40	795	791	83	469	24	143	38	0		34	4.3	0		0	
		2004	29	800	794	104	366	25	139	94	0		66	8.31	0		0	
		2005	4	701	688	84	405	30	103	30	0		37	5.38	0		0	
		2006	29	595	587	41	382	29	95	15	0		25	4.26	0		0	
		2007	50	487	481	0	318	21	88	35	0		19	3.95	0		0	
		2008	28	498	414	9	270	29	77	18	0		12	2.9	0		0	
		2009	71	704	699	11	348	14	161	127	0		40	5.72	0		1	0.14
		2010	100	805	793	28	336	18	281	41	6	0.76	85	10.7	0		0	
	2151	2003	41	791	790	74	532	41	96	1	0		35	4.43	0		11	1.39
		2004	28	788	779	98	528	61	45	5	0		27	3.47	0		15	1.93
		2005	5	700	696	51	478	59	75	4	0		13	1.87	1	0.14	16	2.3
		2006	37	593	588	44	377	44	96	7	0		15	2.55	0		6	1.02
		2007	49	494	488	26	370	17	48	7	0		13	2.66	0		8	1.64
		2008	36	487	470	41	305	31	53	12	0		19	4.04	0		9	1.91
		2009	72	700	695	32	488	43	85	6	0		34	4.89	0		8	1.15
		2010	101	805	792	153	463	23	94	16	0		36	4.55	0		7	0.88
	2156	2003	42	795	795	111	568	31	62	4	0		10	1.26	0		9	1.13
		2004	21	799	791	148	491	44	44	14	0		20	2.53	0		30	3.79
		2005	9	692	689	62	504	37	50	8	0		11	1.6	0		17	2.47
		2006	32	593	588	58	411	48	40	13	0		6	1.02	0		13	2.21
		2007	54	502	496	66	324	24	33	22	0		8	1.61	0		19	3.83
		2008	33	505	503	46	310	42	62	22	0		14	2.78	0		8	1.59
		2009	76	702	701	109	377	47	56	44	0		32	4.56	0		36	5.14
		2010	105	801	794	172	483	27	75	4	0		9	1.13	0		25	3.15
	2157	2003	47	792	788	8	628	85	9	2	0		0		56	7.11	0	
		2004	24	791	778	66	510	139	32	0	0		0		31	3.98	0	
		2005	6	697	695	8	404	136	19	0	0		0		128	18.4	0	
		2006	38	595	590	1	514	49	11	0	0		0		16	2.71	0	
		2007	46	490	484	2	358	72	14	10	0		0		28	5.79	0	
		2008	37	488	483	9	333	42	32	3	0		0		65	13.4	0	
		2009	73	704	704	2	452	104	10	20	0		0		116	16.4	0	
		2010	104	802	794	24	677	56	3	0	0		0		27	3.4	0	
	2166	2003	43	788	788	53	531	187	16	0	0		0		1	0.13	0	
		2004	20	798	209	77	81	37	8	1	0		0		5	2.39	0	
		2005	10	698	688	34	398	185	29	0	0		0		42	6.1	0	
		2006	30	594	588	188	205	174	12	1	0		0		9	1.53	0	

Area (5E)	Station	Year	Set	Hkd	Hko	Nb	Ne	No	614	044	401	CPU	442	CPU	394	CPU	424	CPU
	2166	2007	55	488	485	30	305	126	8	4	0		0		12	2.47	0	
		2008	34	490	481	8	313	126	18	1	0		0		15	3.12	0	
		2009	77	704	692	138	253	215	50	5	0		0		33	4.77	0	
		2010	106	800	784	149	468	146	12	0	0		0		11	1.4	0	
	2167	2003	45	788	786	95	394	44	45	12	103	13.1	92	11.7	1	0.13	0	
		2004	22	795	786	100	300	56	72	28	171	21.7	59	7.51	0		0	
		2005	7	702	697	28	391	96	57	12	70	10.0	47	6.74	0		0	
		2006	39	593	575	20	352	30	70	14	71	12.3	21	3.65	0		0	
		2007	47	489	483	5	272	36	54	51	41	8.49	23	4.76	0		0	
		2008	38	495	484	31	280	34	49	7	43	8.88	40	8.26	0		0	
		2009	75	699	697	24	407	22	76	66	80	11.4	23	3.3	0		0	
		2010	103	801	800	352	247	20	45	12	94	11.7	30	3.75	0		0	
	2168	2003	46	791	789	114	524	25	107	18	1	0.13	0		0		0	
		2004	23	801	795	117	419	58	102	92	7	0.88	0		0		0	
		2005	8	700	698	27	501	51	92	24	4	0.57	0		0		0	
		2006	40	598	583	16	486	13	61	3	3	0.51	1	0.17	0		0	
		2007	48	499	493	10	357	20	53	50	3	0.61	0		0		0	
		2008	39	498	488	83	312	8	72	13	0		0		0		0	
		2009	74	700	698	90	391	23	141	49	3	0.43	1	0.14	0		0	
		2010	102	802	798	290	306	62	127	10	2	0.25	0		1	0.13	0	